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User, U.S. Government Inaction Hurt Independents

By Alan Taylor

IBM has seriously wounded the U.S. independent peripheral suppliers – and the users and the government are accessories after the fact.

When IBM flexed its muscles and attacked the installation of extended core beyond IBM limits, the independents were hit in their most vulnerable spot, their financing.

If the users had fought back and demanded that IBM prove breach of contract, everything might have been all right. But they didn't.

Or if the U.S. Government had demanded that IBM hold off until it had proved that its actions were in conformity with the 1956 Consent Decree, everything could have been all right. But it didn't.

Now the moneymen who back the financing of the independents and their leases are afraid that future IBM attacks on independent installations may jeopardize the security of their loans. After all, no lender wants to get stuck with a lot of money invested in equipment which IBM won't permit IBM customers to use.

CW Investigative Report

This is the second in a series of investigative reports on the effects of IBM's attempt to withdraw maintenance from 360/30 users with memories extended to 128K.

So the U.S. independent manufacturer is being hurt – not because he can't produce competitive quality equipment to compare with IBM's. He finds he can do that easily. But he can't compete with IBM as a financial institution – and users' attitudes are compelling him to try to do just that.

The maintenance withdrawal chaos initiated by IBM on Dec. 20 has shown IBM's power to disturb the institutional lending market, and perhaps frighten it off completely. Whether it actually is frightened off or not at the moment is immaterial – because the venture capitalists on whom new businesses must

(Continued on Page 2)

Judge Rules Against 'DP Error' Defense

By E. Drake Lundell Jr.
Of the CW Staff

DENVER – A company is responsible for the actions of its computer system and must live by those actions, according to the Tenth Circuit Court of Appeals in a case heard here recently.

In the case State Farm Mutual Automobile Insurance Co. said it was not liable under a cancelled insurance policy since the policy had been automatically renewed by the firm's computer system.

But the judge disagreed. "The reinstatement here was the direct result of the errors and oversights of State Farm's human agents and employees. The fact that the actual processing of the policy is carried out by an unimaginative mechanical device can have no effect on the company's responsibilities for those errors and oversights."

Facts of the Case

The facts of the case, *State Farm Mutual vs. Bockhurst*, are clear, according to Judge J. Murrah.

The plaintiff's policy lapsed on Aug. 24, 1969, and on Oct. 4 at approximately 12:45 a.m. he was involved in an accident that resulted in the death of a pedestrian.

Later the same morning he wrote a check to State Farm sufficient to pay a six-month premium on the policy. He also informed his agent of the accident.

The agent mailed the check to the firm's regional office, but did not include information on the accident or the exact time that he received the check (1 p.m.).

The agent later informed officials at the company that the accident had taken place, but while the claims division was conducting an investigation, the policy service division received the check and computerized it in accordance with normal business practice.

The computer, having no input

(Continued on Page 2)

'Where's 007?'

A system reminiscent of some of James Bond's equipment is being used experimentally by the Nuremberg, West Germany, police to keep track of their patrol cars. The Siemens-developed system regularly polls each car's radio, determines the car's location after the returning signal is picked up by four widely separated receivers, and displays the car's number on the CRT.

Ghosted Programs For Sale

ANN ARBOR, Mich. – Students have long cheated on their school work by hiring outsiders to write term papers for them, but now the practice has spread into computer science departments.

At least one firm here, Creative Research, is performing programming for computer science students at the University of Michigan and other nearby universities for a fee as a "sideline" to its profitable term paper ghostwriting service.

How many other firms offer similar services is not known, but one source said the practice is "spreading" and could be in operation in any large university community.

"A student couldn't get completely through the computer science program here relying on outside program writers," a professor at Michigan said, "but he could get pretty far in the basic courses.

"In the more advanced courses, he would be tripped up by the exams if he never did any programming on his own," he added.

"But relying on the outside service would really hurt the student in the long run," he added, "because he wouldn't be getting the knowledge he needs to work with computers in his later career, whether it is in business, engineering or whatever."

Students at the schools here can get any program written for them for a relatively small fee – usually $11 to $14 for a simple program – and not have to do any of the work themselves.

Middleman Firm

Creative Research acts as a middleman in the operation –

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Would End Their Use

Suit Hits 'Inaccurate' FBI Files

By a CW Staff Writer

BOSTON – The Federal District Court here has been asked to rule that FBI maintenance and dissemination of incomplete or inaccurate criminal identification records violate the Constitution.

Paul Cowan, who claims he lost his job through false records contained in the FBI's data bank of criminal identifications, filed the class action suit here last week claiming that such data bank information violates the First, Fourth, Fifth, Ninth and Fourteenth Amendments of the Constitution.

The FBI declined to comment on the matter.

The defendants in the case are J. Edgar Hoover and Richard Kleindeinst, in their official capacities of director of the FBI and acting attorney general respectively.

Cowan claims that many people – "too numerous to bring before the court" – have had their rights infringed by incorrect records in the FBI's data bank of personal information.

Records Purged?

He claims that he, along with many others, have been charged with crimes but later have had the charges dismissed or been acquitted without the FBI noting the acquittal or dismissal in its records.

In these cases, Cowan charges, the FBI's records "remain incomplete or inaccurate in a substantial or material way."

The FBI's maintenance of such files, whether computerized or manual, "constitutes an abridgement of plaintiff's constitutional rights and results in continuous irreparable injury to plaintiff," Cowan says.

"Past and future dissemination of plaintiff's arrest record to law enforcement officers, potential employers and other persons has abridged and will abridge plaintiff's constitutional rights.

"Unless enjoined or corrected, each future dissemination of this record . . . will cause additional irreparable injury to him," the suit claims.

Case History

Cowan admits that in January of 1970 he was arrested in Brooklyn, N.Y., on a charge of possession of a dangerous drug (marijuana), a misdemeanor in the state.

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User, U.S. Government Inaction Hurt Independents

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rely are frightened that the market may withdraw at almost any time and that they will lose their money.

The users whose basic attitudes are at the bottom of this quite serious threat to the computer equipment suppliers, are apathetic about the situation. They are remaining on the sidelines, apparently unaware of how the result of the fight will affect their future capabilities.

There are three types of financing needed by the independent computer manufacturer – venture capital to prove his capabilities, working capital to produce and sell his goods and loan capital to finance his customer installations.

Few other industries have to finance their customers. Most of them expect to receive full payment 90 days after the goods are shipped. Even where this is not true – as with auto dealers – they expect to get an agreement to pay over two or three years, and they then can sell the agreements to the institutional lenders.

But DP customers expect to be given the goods, and to be able to cancel at any time on a 30-day basis – so their agreements have always been hard to get financial support for.

After Data Recall, it is unlikely that pioneering firms who dare compete with IBM will be able to get loan capital support so that the venture capitalists, who are needed to start them, are withdrawing from the area.

This cycle could be seen in full force during a tour of the country after IBM actions. Already, rumors were rampant. Rumors of employment cuts. Rumors of redirection of loan money into more undisturbed areas. On the West Coast, rumors have centered on a large bank which has bankrolled many computer ventures, including the financing of non-full-pay-out leases. Reports say that such financing is being stopped. And that the loan department concerned is being unexpectedly cut back. Almost every concerned financial institution is holding so many meetings to discuss the situation that rumors are bound to arise.

Whether the rumors are true is not the point. The important fact is that they exist, and are already strong enough to disrupt the delicate financial balances supporting customer financing. The venture capitalists notice this has happened even though IBM has only attacked part of one of the smaller independent markets.

And they wonder what would happen if the corporation repeated its actions elsewhere. They remember Carterfone: the case was won but the company was lost. They remember RCA, and the disturbance that its withdrawal caused in the markets. And the venture capitalists don't see any way to prevent such disturbances in the future – and they know that if such disturbances continue, loan funding may be impossible.

IBM, of course, has no such worries. It has its own resources. It can draw on its Prudential Insurance Co. credits to back those 30-day agreements. The more the loan market is disturbed and the more difficulty customers have in financing non-IBM equipment, the more they will tend to take the IBM route. So IBM's backers can regard a disturbed loan market situation as additional safety for their loans, rather than a detriment.

Firms out looking for money will find it difficult. International Computers & Peripherals Corp., Santa Ana, Calif., for instance, has a complete breakthrough product already operational, and is looking for money. It is a universal controller – and provides the IBM user with an alternative source for tape and disk controllers. Moreover, it lets him really exploit his tape and disk systems by providing for additional types of instructions, and more flexibility in general.

It's something that IBM could have provided years ago – just a microprogrammable controller like the disk controllers that have been around for a long time – but it's designed to provide flexible service for the user, instead of forcing his growth along a path that IBM has predetermined for him. And that is a breakthrough.

The controller is programmed to control 2314s, and is ready for full funding.

However, potential backers cannot help but notice that IBM may believe the controller can cut into IBM's markets, and that IBM may react strongly. The fact that IBM has had the capability to put out essentially the same product for seven years, and has failed to do so, (therefore essentially emasculating its technical staff) only underlines the chances of arbitrary actions being taken which can result in the scaring off of the loan capital. And this must make some prospective backers think twice about financing it.

But, if International Computers & Peripherals – and the many other firms like it – doesn't make the grade, and is not able to put its products before the users, then the U.S. computer customer will not have the wide choice of equipment to choose from when he goes shopping. Unless, of course, the choice is going to come from outside the country, where there is less fear of IBM. (This is the subject of next week's report.)

Meanwhile, the U.S. independent computer manufacturer is being hurt. Not because he can't compete with IBM as a computer manufacturer, but because he can't compete with it as a financial institution.

Suit Hits FBI's 'Inaccurate' Records

(Continued from Page 1)

He was booked, fingerprinted and the New York City Police Department transmitted to the FBI information on the arrest and on Cowan.

The criminal charges against the defendant were dismissed by the Criminal Court of the City of New York, Kings County (Brooklyn), but the FBI has never updated its record to indicate the dismissal, Cowan maintains.

Cowan moved to Boston, applied for and received a license to drive a taxi in Massachusetts. Later the "hack" license was lifted by the Boston Police Department because a routine check of his fingerprints with the FBI revealed that an "open" charge of possession of narcotics was pending against him.

A member of the Boston Police showed Cowan an FBI report with the column marked "disposition or sentence" blank, Cowan claims.

Cowan appealed explaining that his case had been dismissed by the court in New York, but the concerned officials continued to deny his request for reinstatement of his license, Cowan adds.

In his suit, Cowan charges that "it has been and is the practice" of the FBI, Justice Department and their agents "to hand over, divulge, publish and circulate information contained in their criminal identification files to other persons and organizations including but not limited to other government agencies and officials, particularly law enforcement officers, as well as potential or prospective employers in the public and private sectors and other persons, organizations and corporations."

This dissemination of criminal information has "caused irreparable injury to the plaintiff since it has directly caused him loss of employment."

Further, Cowan charges the maintenance of such information "as it is contained in the FBI files, serves no legitimate governmental purpose. The dissemination of such information serves no valid governmental function or legitimate governmental purpose."

Further, the suit asks for a "preliminary injunction restraining the defendants and their agents from soliciting, compiling and maintaining incomplete and/or inaccuracte arrest records . . . and from circulating, disseminating, publishing or in any way divulging information" from such records "to any person, agency or organization including and especially any law enforcement officers and any prospective employers."

Extension Sought on Sharing Data

WASHINGTON, D.C. – The FBI is seeking to extend for another year its authority to share criminal data bank information with banks and state and local officials other than law enforcement officials.

The move, contained in the agency's $336.9 million budget request for fiscal 1973 (which starts this July), will come under close scrutiny by Sen. Sam J. Ervin's (D-N.C.) Subcommittee on Constitutional Rights, subcommittee sources said last week.

The FBI presently has the authority to disseminate information on individuals to federally chartered or insured banks and to state and local officals for the purposes of employment or licensing, but that authority runs out at the end of fiscal year 1972 (June 30).

The FBI gained the authority as part of a little known section (902) in an obscure supplemental money bill (Public Law 92-184, Chapter 10) which was passed by Congress with little debate as it rushed to adjournment last year.

Previously the agency had been barred by a court order from sharing such information with any one other than other federal agencies for employment purposes.

The ruling, by Federal District Court Judge Gerhard A. Gessell here last June, was hailed as a breakthrough by civil liberties groups, but the ruling was overturned by the legislation in the supplemental appropriations bill last year.

The new legislation before the Congress would extend the FBI's authority to disseminate information from its data banks until June 30, 1973.

Normally, budgetary bills are only examined by the appropriations committees of the House and Senate, both of which have already started action on the FBI's 1973 budget.

Much of the testimony, including that of FBI director J. Edgar Hoover, is still secret, but what has been released by the Senate committee contains no reference to the extended authority sought by the agency.

'DP Error' No Defense, Judge Says

(Continued from Page 1)

concerning the accident or the exact time that payment had been received, automatically issued a notice reinstating the policy, effective retroactively as of 12:01 a.m. on Oct. 4 – approximately 45 minutes before the accident occurred.

A month later, State Farm notified the plaintiff that the reinstated policy could not be effective until the time when the company actually received payment to its agent – that is, approximately 1 p.m. on Oct. 4.

The trial court held that State Farm voluntarily and intentionally waived its right not to renew the insurance contract and agreed to extend the coverage for the period of time when the accident occurred.

In appealing that decision, State Farm claimed that it did not waive its right not to renew the policy since the renewal had been handled automatically by the computer system.

The court of appeals, however, held that State Farm had the facts about the accident before it renewed the policy and did not stop that renewal.

"The trial court's findings leave no doubt that State Farm was in full possession of all relevant information concerning the accident before reinstatement was actually issued," the court said.

"The fact that the company's policy servicing division may not have had knowledge of the accident until after the payment was placed on the computer is not controlling.

"One hand of the company must be charged with what the other hand knows and does," the court ruled.

In addition, "the computerized reinstatement was not unavoidable as State Farm alleges," the judge said.

The court concluded that "holding a company responsible for the actions of its computer does not exhibit a distaste for modern business practices as State Farm asserts.

"A computer operates only in accordance with the information and directions supplied by its human programmers. If the computer does not think like a man, it is man's fault."

Students Buying Ghosted Programs

(Continued from Page 1)

finding a programmer to write the students' program for him if he cannot complete it either through incompetence or lack of time.

The firm draws on programmers in the Michigan region to write the "student's program" and most of the hired programmers either come from local businesses or from advanced computer science students at the university itself.

In introductory courses the firm gets its programmers to prepare a card deck for the student, which he then runs on the university's computer. The computer records that the program has been run correctly and gives the student the credit for completing that part of his course work.

In more difficult cases, the programmer hired by Creative Research actually uses the student's assigned number to gain access to the university's computer to test and debug the program.

Computer Time

Each student in the course is given a special identification number that allows him access to a predetermined amount of computer time – the time dependent on the amount of time needed to write and debug the particular program he is working on.

Since the "professional" programmer can often complete the assignment faster than the student would be able to, sources here said he would probably be able to use the extra time on the university's computer for his own projects.

The firm said it "tries to keep prices down" so that most students could afford the service and noted that most of the profit – around 70% – goes directly to the programmer hired to do the work.

Calif. Centralization

Huge Savings Seen With Welfare Plan

By Marvin Smalheiser
CW Correspondent

SACRAMENTO, Calif. – A planned computerized welfare information system that could save the state an estimated $133 million annually will have to overcome tough opposition before it is approved.

The system, said to cost $4 million, was proposed by the state Department of Social Welfare, which is now reviewing recommendations made by the state's Department of Finance, where a spokesman said, "Our basic desire is to implement the system as soon as possible to begin to accrue the savings," if modifications in the original proposal can be made.

Legislative committees, however, are holding hearings on the proposal and some sharp criticism based on a legislative study is expected to be aired.

Carl B. Williams, chief of the management information systems branch of the Social Welfare Department, said the terminal-based system would connect California's 58 county welfare departments to a centralized welfare mass memory of 12 to 14 billion characters. It would enable clerks at county branch offices to inquire about an applicant's eligibility in minutes instead of hours.

Reports and inquiries would go through CRTs, except in small counties that would use teletypewriters. Counties with less than 100 cases would telephone a larger, neighboring county.

A spokesman for the Office of the State Legislative Analyst said the feasibility study was inadequate and there were shortcomings in the development of the system as well as the request for proposals.

The spokesman said it was recommended that the deficiencies be corrected before the legislature grants funds.

Williams said the system would reduce fraud costs by $28 million, grant errors by $51 million and administrative cost by $44 million.

The system would set up a centralized index of known welfare applicants, randomly accessible on-line, so that a county getting an application could key in through a terminal and find out whether a person is on welfare or has been at any time during the past five years.

The system would also enable the department to get income reports from the Department of Human Resources, which collects the information for unemployment insurance benefits.

A third phase of the system would reduce grant errors by enabling the department to do a pre-audit on grants and correct over-and-under-payments.

The reduction of administrative costs would be achieved by cutting the amount of county manual reporting. Williams said counties now have to provide between 1,400 and 2,000 separate reports annually.

The major problem in developing the system, Williams said, is that 58 counties now have several forms of automation and many types of equipment and sophistication.

The system will take information off the front end, as it comes into the county welfare offices, before it is entered into their individual systems.

The welfare department has a Burroughs 3500 and an IBM 360/30, but plans to add equipment. Most of the 12 to 14 billion characters of information would be on tape, at least for some time, Williams said.

Sheriff's Records To Be Computerized

LOS ANGELES – The county board of supervisors has approved a proposal to computerize the Los Angeles Sheriff's Department records.

The project will take two years and will involve the computerization of index cards, fingerprints and record folders. It will be funded with $1,205,213 in federal money and $804,454 from the county.

The county is negotiating with the city to participate so that the computerized system will be available to all criminal justice agencies in the county.

County Study OKd

LOS ANGELES – A comprehensive management study of Los Angeles County's data processing operations has been approved by the board of supervisors.

The eight-month study will cost $174,640 and will be made by Arthur Andersen & Co., Los Angeles.

The study is intended to strengthen the department's operations and would also analyze the county's long-range plan to consolidate seven existing data center groups into four information processing facilities linked by microwave.

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CW Southern Computer Users' Forum

On-Line Entry Systems Cut Clerical Decisions

ATLANTA – "I'm sold on full record display for any kind of input device," one of the area's leading users of keypunch replacement equipment said at last week's Southern Computer Users' Forum and Exposition sponsored by *Computerworld*.

Video display does not bother the operators of key-to-disk or shared-processor input systems, since operators do not look at the "tube" unless they know they have committed an error, according to Jerry Finley, EDP input manager at Rich's department store.

While some users feel a CRT

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inhibits keying rhythm or distracts operators, Finley disagreed. He said the "tube" on his Inforex keystations has a positive impact on throughput, since errors can be spotted instantly, and corrected, before they become a permanent part of a record.

Dick Jones, assistant vice-president for data processing at Retail Credit Corp., stated "it isn't even necessary to be able to type" in order to operate on-line entry systems.

"In three weeks, we can teach typing, CRT terminal operation and other general work," he said, "and have a worker productive at the end of that time."

Other manual systems for data entry sometimes required up to a year of training, Jones, leader of the on-line entry systems workshop said, "and we had a 40% annual turnover rate."

On-line data entry reduces clerical decisions, since the computer can prompt the operators into keying simple answers to basic questions. Data flexibility helps balance the considerable cost of operating in this manner, he added.

Most problems encountered by optical character recognition equipment can be overcome by quality control before scanning, according to panelist and OCR workshop leader Glynn Ingram of Atlanta Gas Light.

Quality control on the printer is his firm's "biggest single problem," he said. The print train is replaced about every six months, with careful attention to the ribbon. If characters are too close together or if the side of a character is blocked off, problems develop, he said.

Documents must also be cut properly. His firm uses register marks to ensure accuracy. If burst forms are used, quality is vital, he stressed.

The error rejection rate is 1.5% on meter reading cards, and an average of 2% for cash forms. Mailed receipts, he said, have a lower rejection average than those paid over the counter, which have frequently been folded or otherwise slightly mutilated.

John Wilson, president of Horne Wilson Inc. and leader of the intelligent terminals panel, indicated that intelligent terminals answered his need for a "compromise between the luxurious and the acceptable" data entry techniques.

"We were after labor savings in-house, and general cost reductions outside," Wilson reported, in explaining why he chose intelligent terminals.

The most common data entry techniques in the supply industry can usurp up to 1-1/2% of sales, he continued; "immediate access" was too expensive, he said.

Retransmits Data

"So, we chose batch," with additional capabilities of intelligent terminals.

By admission, Wilson's inventory problems are not common to all industries: he carries 64,000 different items, but only has an average of 64,000 transactions per month.

Dallas Next Stop

The *Computerworld* Computer Users' Forum and Exposition continues to draw an average of 2,500 people per city, through Atlanta, according to preliminary figures.

The three-day conference is being held this week in Dallas, with next week being used for travel to the West Coast.

In Los Angeles, the show will be April 4-6; a Monday to Wednesday format will be used in San Francisco, April 10-12.

Users in Atlanta inspect Itel's 7330 disk drive. (CW Photo by E.J. Bride)

Requirements Most Vital To Planning Dial-Up Net

ATLANTA – Teleprocessing takes much more planning, much more attention to detail than a straight DP site, noted Jack Grantham, of Trusco Data Systems, at his workshop on leased lines at the *Computerworld* Forum on data communications.

Because of the regulations on the phone companies, they often

Second Day

can't tell you some of their capabilities, he observed. But if you ask for a specific service, he suggested, you'll often find they can do it.

When planning for a dial-up network, the user should ask "what should be done" rather than "what can be done," according to A.P. Jensen leader of the workshop on dial-up networks.

One should assess carefully the validity, magnitude and economics of data to be moved, he said. Generally, there are facilities to accomplish what should be done. But first the user has to know his requirements.

With the general philosophy that the phone company runs a cheaper service than he could, Jensen has learned to know Bell's capabilities and to work with its present system.

Jensen suggested that users could instruct the terminals to initially print out data in a standard, recognizable format so that an inadequate transmission line could be recognized.

Bureaucratic Problems

One user mentioned his experience in encountering "bureaucratic problems," in his dealings with Bell. His firm solved the problem by becoming a long lines customer, so his representative is from AT&T, rather than a regional Bell unit.

"Every piece of hardware" needed for on-line applications "has backup" at Southern Railway, according to A.C. Whitehead, director of computer programming.

Any equipment involved in on-line usage has backup, he said, adding the company has also acquired uninterruptible power supply and off-site tape storage as part of its security considerations.

Southern Railway's system handles 20,000 direct inquiries a day, regarding car and freight movement. Railway customers use TWX or Telex terminals to access the data base on the carrier's IBM 360 equipment.

Bernard McIlhany, of the Atlanta Public Schools, leader of the common carrier workshop, told attendees he has worked with "four different data representatives" from the phone company in the last 18 months.

This presents a problem, he noted, since "we have to brief each new representative on our situation." The new representatives "apparently don't read the notes left behind" by their predecessors, McIlhany said.

AT&T is placing "artificial limitations" on users of independent equipment, McIlhany believes. He said the requirement to enter a data signal "at minus 9 dB" is not fair, "when Bell can enter their signals at 0 dB." Users need to be aware of these restrictions involved in dealing with the phone company and with independent suppliers of data equipment, he continued.

Early Auditing of Programs a Cost-Saver

ATLANTA – If you can catch programming errors at the earliest possible stage, the cost of correcting them might be measured in "hundreds of dollars," rather than in thousands, according to Charles Gravitt, head of computer programming at Delta Airlines here.

Gravitt credits "extensive job control" techniques and a "strong organization" for what he considers an efficient, well-run DP shop.

Line responsibility in all departments, plus internal standards, have also improved Delta's efficiency, he told attendees at a panel session on operational efficiency.

There is a control group "between every job step," whether it be in the input, processing, output or distribution phase, he reported. By auditing programs and procedures early in these stages, and stopping a job as soon as errors are recognized, a user can save machine time and money, he noted.

Other ways of improving efficiency that were discussed included operational procedures and education.

The diffusion of EDP is part of the effect of increasing minicomputer usage, Lecht noted, while another user suggested "doing away with all compilers" to keep minis dedicated to only one or a few applications.

George Martin of the Georgia Department of Revenue told his session on independent peripherals that the decision to install independent equipment saved the state $50,000 in 13 months.

His center has 16 Memorex disk modules, Telex and IBM tape drives along with a 360/40 and 360/50.

In evaluating equipment, he

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suggested the user have his own technical staff evaluate throughput performance using benchmarks oriented toward his specific needs. An inappropriate benchmark can give very misleading results, he said.

Throughput should be evaluated in conjunction with cost, taking into consideration the user's needs and anticipated growth, he added. "Although many of us might not want to, it's often to our advantage to downgrade," he said. The DP manager should also remember his users when looking at equipment, and its ability to satisfy them.

"Although many people don't realize it, buyers have a legal right to draft their contract. The vendor has the right to accept or reject it. It's a two-way street," Martin said.

The vendors will try to make you believe they only have a standard contract, he said, but this isn't the case.

One suggestion for contracts from a user was to require the independent vendor to pay for a mainframe maker's service time when, after the independent claimed trouble lay in the mainframe, it was found to be in the independent unit.

"After a lot of arm-twisting, IBM put on its System Measurement Instrument, and we found we weren't using our processors," commented Jack Lotz, vice-president of The First National Bank of Birmingham at his workshop session on extended core.

The bank then replaced its three IBM 360/20s at remote branches with 360/22s onto which it added 32K core, giving 64K machines. This eliminated all teleprocessing to the central bank, which formerly had a 360/50 and two 40s. By upgrading the branch CPUs, it reduced its 360/50 to a 40 also.

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Personnel Resistance Also

License Plate Renewal Plan Survives Undertraining

By E. Drake Lundell Jr.
Of the CW Staff

LOUISVILLE, Ky. – Overconfidence, undertraining and personnel resistance almost sabotaged the new Louisville-Jefferson County computerized vehicle license plate renewal system.

The Computerized Auto Registration System (Cars), operated jointly by Louisville and Jefferson County here, was designed and written in about 85 days, but not enough time was left for training, according to Edward W. Mueller, director of the joint data processing department.

At the same time, a long-time observer of the city and county said the system was oversold to people in the county.

"They told everyone there would be no problem or delays with registration," he said, "so everyone waited until the last minute to get their plates, causing a jam during the last two weeks of the registration period."

State Law

The system was inaugurated because state law requires everyone to register their cars in January and February of each year, causing a crush on the county clerk's office which administers the program.

Louisville and Lexington are the two major cities in the state and both experience some problems at renewal time, an observer said, but the smaller counties like the arrangement since they only have to put extra people on the payroll once a year.

Because of the lack of training and education in the use of the CRT-based system, many problems have plagued the system, Mueller conceded.

With the system, the operator just had to type in the car owner's 1971 license number and the computer (an IBM 360/40) responded on an IBM 2260 display with all of the information stored on that vehicle.

The operator then typed in the new 1972 license number and updated registration and title information. The system would automatically print out the 1972 registration and title papers.

The untrained operators, unfamiliar with CRTs or computers, were quick to blame most of the problems on "the computer," when in fact they were not computer problems, Mueller said.

In one case, he said, one of the four outlying offices tied into the system ran out of license plates, which were supposed to be picked up manually.

Instead of telling the people waiting in line they were out of plates, however, clerks at the center told the waiting car owners the computer was not working.

Many of the people used to operating the manual system also were reluctant to use the computer system, Mueller added.

In some cases clerks would stop using the CRT units and type out renewal applications on their typewriters as soon as supervisors left the room.

The only way to tell this was happening, Mueller said, was to watch for the clerks with large lines, since most of the clerks were in separate rooms.

Hardware Problems

The only problem caused by hardware failure was grounding of the system when it first went up at the beginning of January, he said.

The ungrounded electric circuits were interfering with the telephone lines, he said, causing problems in the system. A few $15 transformers solved the problem, however, he added.

In some cases it appeared the hardware failed, he said, such as when an employee inadvertently switched off a printer several times. This puzzled some of the DP people, until the cause was found.

In addition to speeding up the service to car owners, the system allows the county to process applications with fewer employees.

In the past the county had to add as many as 150 extra clerks for the processing period, but with the new system it has been able to cut that number in half.

The manual system of updating the records also wasted time.

"It formerly took as long as eight months before police officers had access to accurate license number information. Now even while a clerk is handing the new plates to the owner, his vehicle license number is recorded electronically and police officers can recover it when needed," Hallahan said.

And while the police files are being automatically updated, so are the files of the property valuation administrator, who levies auto taxes in the county.

Radiologists Test Retrieval System

BOSTON – Radiologists at the Beth Israel Hospital are developing an X-ray reporting system which will let them generate and retrieve patient reports directly by computer. Previously, limited retrieval, and only by broad categories, was possible.

The computerized version of the system, now in the experimental stage, is based upon alphanumeric coding of the three major elements of any abnormality that can be seen on radiologic examination – the location of the disease, a description of its features and its diagnosis.

Each category is subdivided to permit coding to the smallest practical unit.

For institutions without computer capabilities, the classification system may be followed easily by flipping through a coded handbook prepared by the Beth Israel radiologists. With the manual method, a simple card file, marginal punch cards or IBM cards may serve as the storage medium.

Instead of dictating or writing a long narrative as is standard today, the radiologist sits at a keyboard and types in a short series of codes. Retrieval of any report for scientific review is easily accomplished. To the patient's primary physician and nurses on the floor with a terminal at their disposal, it means the patient's report may be immediately transferred from the radiology department to the patient's floor.

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Now there's a single-spindle storage subsystem for massive data bases up to 100 million bytes: the new ITEL 7330 Disk Drive. Using standard IBM 3336 disk packs, the ITEL 7330 increases storage capacity more than three times over previous models to 800 million bytes for an 8-drive subsystem. It's plug-to-plug compatible with IBM System/370. And it's quick on the draw; average access time is just 27 milliseconds.

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The ITEL 7330 is the latest in a line of advanced disk storage drives from the Information Storage Systems Division of ITEL. More than 3000 ISS disk drives are working today, proving themselves to be the industry standard for reliability.

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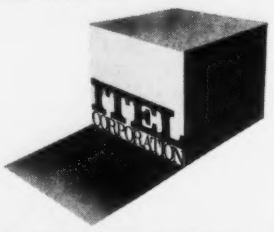

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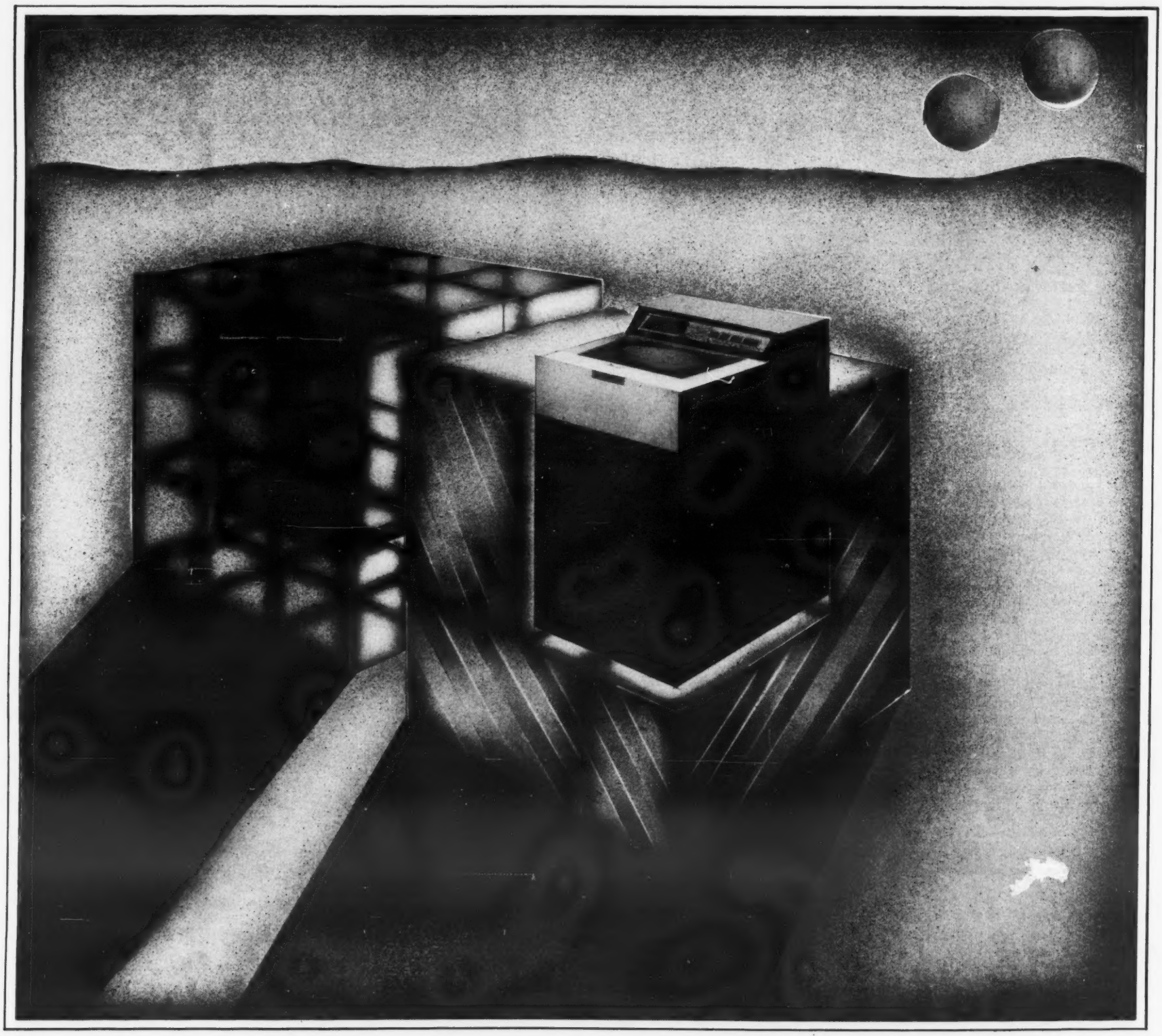

Pay Dates Wrong, 12,000 Checks Voided

DOVER, Del. – Because a computer program was not modified to take into account revised pay dates, more than 12,000 incorrect state employee payroll checks were printed recently, according to John T. Hill, director of the state data processing center.

The program was not changed to adjust pension withholding to note that the workers were getting paid a day later than usual and so the checks reflected too few deductions. State payroll dates were changed because of a new state law that requires payment on the first and sixteenth of each month instead of the fifteenth and thirteenth as had been the case.

The incorrect checks were sent to the state treasurer's office where they were voided and kept on file for future audits.

After a program modification, the deductions were recomputed and the correct checks printed to meet the March 1 deadline.

"People make mistakes . . . computers don't. They only do what you tell them to do." Hill added.

News Wrapup

Mounties Hold Bombing Suspect

OTTAWA, Canada – One of the brothers wanted by the Federal Bureau of Investigation in connection with a bombing at the University of Wisconsin in Madison in 1970 has been arrested by the Royal Canadian Mounted Police in Toronto.

Karleton Lewis Armstrong is currently awaiting extradition proceedings to the U.S.

After the bombing of the Army Mathematics Research Center in which one researcher died and $1.5 million of computers were demolished [CW, Sept. 2, 1970], the FBI began a nationwide search for four young men.

One of the suspects still at large is Armstrong's younger brother, Dwight. The four face charges of first-degree murder, sabotage, destruction of government property and conspiracy.

City DP 'Short-Circuited'

PITTSBURGH – Half of the city's computer system, leased from NCR for $26,000 a month, has been switched off, the victim of the mayor's austerity drive.

William Smith, the city's DP manager, blamed budget cuts for the loss of a modernized police communications network; the rationing of space on the remaining memory bank, which has stalled efficiency programs for many city departments; and a workload for the functioning equipment amounting to little more than adding machine terminology for simple tasks.

Savings from the cutbacks amount to about $4,000 each month and the city plans to spend about $22,000 for monthly rental of the remaining equipment.

Tax Discrepancies Shown

SPRINGFIELD, Ill. – A comparison of state and federal records on 1969 tax returns from state taxpayers has revealed 178,000 cases of discrepancies, according to state Department of Revenue Director George Mahin.

A computer has shown discrepancies to include taxpayers who filed federal tax returns in 1969, but didn't file state returns and taxpayers who filed different information with state and federal officials.

The Internal Revenue Service supplied the state with a tape of information on federal tax returns for 1969 credited to Illinois. Records of the 151,114 taxpayers who filled out federal returns but failed to make state returns will be checked to determine whether they should have paid Illinois taxes.

Short Work Week Catches On

BOSTON – Two-hundred and-ninety employees of the John Hancock Insurance Co. will soon begin a 13-week experiment with the four-day work week.

The workers are in four divisions: record services, direct collection, mail and data preparation. The goal of the experiment is to "allow the company to make a valid determination as to values and/or the drawbacks of the four-day work week."

'Computer Made Me Do It'

PARIS – So now maybe you won't have Uncle Harry to blame for that rotten Christmas tie.

A department store here boasted it could select the perfect Christmas gift for anyone – and so it used a computer. The shopper provided the computer with age, the sex, weight and personal pleasures of the recipient and made thousands of selections from the information given it.

After the holidays there were still long lines of people waiting to exchange gifts picked for them by the computer.

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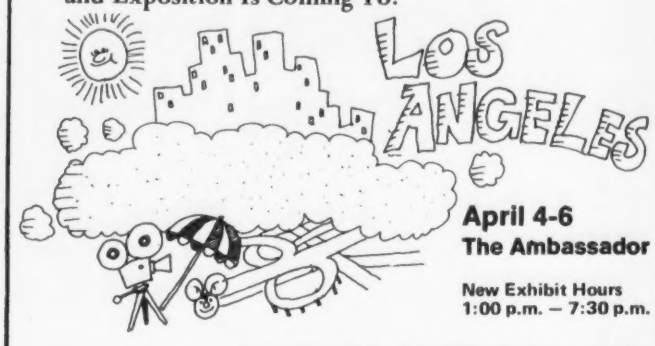

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Special Report

Part IV

Storage and Internal Processing

Government Agencies Pioneer

Performance Data Lacking

Mass Storage Systems Just Waiting for Daring Users

"It becomes a numbers game . . . you start to make comparisons with hundreds of tape reels and packing densities of 700,000 bit/sq in. and the mind begins to boggle." — a user.

By Ronald A. Frank
Of the CW Staff

Mass storage systems may well be the wave of the future but few of the huge systems have actually been installed.

When users consider mass storage systems, they have to think in terms of billions or even trillions of bits. And price tags around the million-dollar mark are not uncommon.

"It becomes a numbers game," one user says, "you start to make comparisons with hundreds of tape reels and packing densities of 700,000 bit/sq in. and the mind begins to boggle."

But despite the statistics, the large storage systems are close to being accepted by larger users.

Most of the mass storage makers feel their systems are best suited for applications with relatively few accesses of large blocks of data. Within this general framework are government agencies, insurance companies and banking institutions.

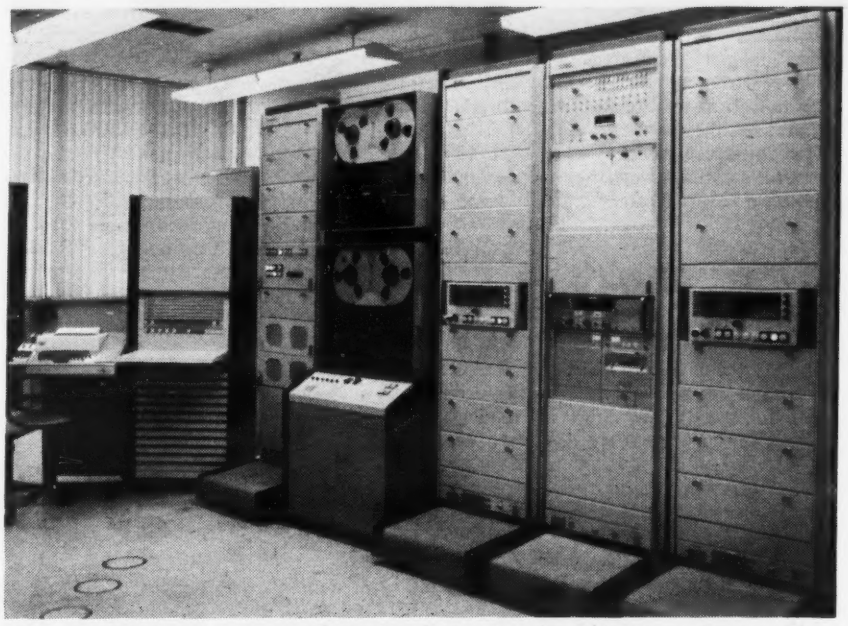
While these larger users probably will be among the pioneers of mass storage systems, smaller-scale applications may well follow for medium-scale system processing centers.

Unusual Systems

When users consider a mass storage system, conventional trade-offs don't apply. It is difficult to think in terms of benchmarks since,in most cases, there can be no direct comparisons with other systems. Some users talk about storage cost/bit but even this becomes muddled when answers like $.0007/bit come up.

One mass storage system on thy verge of its first delivery is the Ampex Terrabit Memory. The TBM is scheduled to be delivered to a government agency "within the next three months," according to Manfred Wildmann, general manager for the storage system. Because of government restrictions Wildmann will say only that the TBM has been in operation at his company since last September, and when installed it will be running continuously 24 hours a day.

The TBM is described as a tape system but that is where the similarity ends. The system uses 2-in. wide video recording tape. Data is recorded as an FM representation of a digital bit stream. The FM is completely transparent to the user and is automatically encoded and decoded during read or write operations, Wildmann says.



This Terrabit mass memory system has been operating in-house at Ampex. The first user installation is scheduled later this year.

Big Reduction

"With a TBM, a 500-to-1 reduction is possible in recording media when you convert from fully packed conventional tapes," Wildmann says. "And most tapes are only 25% packed so here a user would see a 2,000-to-1 reduction for the same amount of data," he states.

A "minimum" TBM system is the equivalent of about 13, 3330 disk systems, Wildmann says, but he doesn't like to make the comparison. "Most TBM users will be replacing tape drives," he predicts.

One of the more glamorous mass storage devices is the Unicon system made by Precision Instrument Corp. The Unicon includes a laser that "burns" bits of information onto rhodium-coated polyester strips. With a trillion-bit capacity, the Unicon system equals about 10,000 reels of 800 bit/in. tape or 4,800 disk packs.

"Prospective users that we talk to usually have a file maintenance problem," says Ed Gray, vice-president of Precision Instrument. "There are hundreds of companies which have literally tens of thousands of reels of tape. And since it isn't practical to keep this much information on-line, they keep it off-line where they really can't make efficient use of it."

The Unicon is really a simple device, according to Gray. Despite its laser action, Gray says recording data on a Unicon system is much like "punching paper tape." After data is recorded by the laser onto the polyester strips, it is non-erasable. This means that an updated version of a particular "file folder" requires that the user re-record the information. But Gray doesn't consider this a drawback. The permanent quality of Unicon records lends itself to applications such as insurance where it is often desirable to keep a complete historical record, he believes.

This archival benefit is also pushed to a lesser degree by Wildmann with the TBM. "Because the system has 100% redundancy and because it exceeds the storage capacity of conventional tapes, the TBM is well suited to long-term storage," he says.

The prime prospect for a Unicon system has a file size of a trillion bits or one that will grow to that size in the foreseeable future, Gray believes. This Unicon prospect is changing or editing only about 10% of his total file at any time, and he needs his information on-line.

"Because thesystem has 100% redundancy, and because it exceeds the storage capacity of conventional tapes, the TBM is well suited to long-term storage." — Manfred Wildmann, general manager of TBM storage systems.

A Unicon system has been delivered to the government and is operating at the Ames Research Center, according to Precision Instrument. A spokesman at the installation said there would be no comment on the operation of the Unicon system "for at least two to three weeks."

One user who seriously considered both the TBM and the Unicon feels these systems are not yet ready to meet his needs. "The present stage of development, the speed and the capability to overlap operations were not up to using either TBM or Unicon in a random access environment," the user says.

"The speeds of the mass storage systems seem to be best for applications somewhere between batch and on-line processing." — a user.

The speeds of the mass storage systems appear to be best for applications somewhere between batch and on-line processing, according to the user. "Even if they fit into our operating environment, we would like to have some reliability figures from users before we make a decision," he adds.

The prospective user of a mass storage system has to look carefully at the area of

(Continued on Page 9)

User Settles on Data Cells

"Many users have been unhappy with data cell storage, but many users programmed these devices incorrectly." — Art Lemay, vice-president of Transunion.

One user with large file storage requirements sampled the specifications of the announced mass storage systems and settled for a medium that has been around for some time.

Transunion Systems Corp. stores its consumer credit information on IBM 2321 data cells. "Many users have been unhappy with data cell storage," says Art Lemay, vice-president of Transunion, "but many users programmed these devices incorrectly."

The reporting firm, which supplies local credit bureaus with consumer credit data, uses the data cells primarily in a read-only application during on-line seeks. "The data cell is a slow device," Lemay conceded, "but we look at only a third of our records that we have on file. So our activity to file size ratio is unusually low."

Based on system measurement tests, Transunion is utilizing its data cells for only 17% of the total available seek time on the CPU, which is a 360/50. "We could run eight data cells without straining our available CPU channel time," Lemay says.

Before going to the 2321s, Lemay evaluated mass storage systems. The Terrabit was much too slow on sequential access speed, he says. And although the Ampex system had a large enough storage capacity, it was best suited to a batch-type application.

Grumman Masstape came closest to Transunion's "usage profile," but it also seemed a little too slow, Lemay notes.

The most promising system appeared to be Precision Instrument's Unicon, but its size was a bit overwhelming. "One Unicon could store all the credit records in the country," Lemay jokes, "but its technology looks like it would be perfect for our application in the future."

There have been some problems with the data cell but Lemay feels they have not been excessive. "It's a more tempermental system than a disk. We have had some strip crashes and service problems, but overall it has been an adequate system."

Lemay likes the 2321 storage strips which are nine inches long and hold about 2,000 bytes when using full blocks. "They are a removable medium and allow us to store father and grandfather files off-line in data cell bins," he adds.

The Transunion data cells operate 14 hr/day and cost the firm about $13,000/mo. "I estimate a Unicon system would cost about $30,000/mo for about 20 times the storage," he adds.

Users Wary of Mass Storage

(Continued from Page 8)

interfacing once he has decided a massive memory is what he wants.

"The interface is dependent on the application," Wildmann believes. "You have to talk to the user, see what his average block size is and find out how he blocks his data.

"Both the TBM and Unicon use minicomputers as controllers," according to one prospective customer. "So you have some degree of control with a familiar device." he adds.

While using the same "building blocks," Ampex has not been able to come up with a single interface that will satisfy every user. And since the goal is to interface a TBM to a user's installation "as painlessly as possible," each system may well become a custom configuration.

One user who considered both TBM and Unicon thinks they "have to compare directly with 3330-type technology." This user foresees "a double or triple density 3330-type disk within two or three years at half the cost/bit of current disks.

But one mass storage marketing manager refutes this theory. "We're not going to go much further in packing density on disk than the 3330." He points out that the announced storage systems are already cheaper on a bit comparison basis than available disks.

While users continue to perform mental trade-offs between systems like TBM and Unicon, some other alternatives are available.

The Orion Products Co. makes a 300 Mbit/sec digital magnetic tape recorder called the Titan GW 300 that can store 25 billion bits of data. This is equivalent to about 60 reels of conventional tape and may well be the first of a new breed of "semi-massive storage" systems.

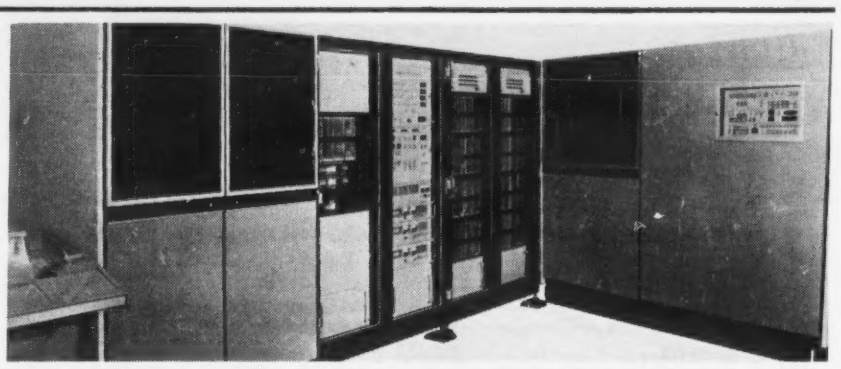
Strictly a Tape Drive

But the Titan is strictly a tape drive. Although it can operate at 600 in./sec and uses 1-in. magnetic tape, Orion has not configured the Titan into a complete system. That job has been left to EG&G. And a spokesman for EG&G said that only one system using the Titan has been delivered to the Atomic Energy Commission for an application far removed from business processing.

But an EG&G engineer agrees the Titan could be configured into a business system somewhere between the fastest disks and the smallest mass storage systems, if some user demand develops.

Meanwhile, Grumman Data Systems thinks users can grow into a mass storage system via the modular approach of its Masstape. At present, "elements" of the Grumman system are operating in-house and the firm expects its first delivery to be made in the third quarter of this year.

Masstape differs from the other systems in its use of "instrumentation" tape arranged in special crescent-shaped cartridges. These cartridges or "pacs" can be interchanged to give the user modularity and mobility, according to Grumman's Roy Davies.



With a trillion-bit capacity, the Unicon systems equals about 10,000 reels of 800 bit/in. tape or 4,800 disk packs.

"By maintaining tape in smaller pacs, users won't find their tapes going 'out-of-round,' Davies says. Conventional tapes often lead to flat spots on reels that have been stored without movement for long periods, Davies says.

A "basic" Masstape system with 15.8 billion bytes of on-line storage will cost about $350,000.

Many prospective users see very real applications for the new breed of mass storage systems. But they are waiting to get some actual operating data from bonafide users. Perhaps the government agencies that operate the pioneer installations will give users some idea of how the large systems perform.

If not, it will probably be only a matter of time until some brave users take the plunge. Then with operating and reliability data the logjam will have been broken.

Videotape Preferred

Users who want a proven large storage system might take a look at the Ampex Videofile if they can live with a storage medium that operates primarily off-line.

Videofile accesses data, stored on videotape, via CRT displays. The system is controlled by an SEL 810 minicomputer.

The retrieval of data is initiated at a CRT keyboard where the operator enters the address number of a file to be accessed. The address is entered into the mini, which in turn checks the Videofile tapes mounted on the system tape transports, and initiates a search operation to access the required record.

A Videofile could hold as many as 25 million "pages," the equivalent of 300 conventional tapes, according to Robert Miner, product manager for the system.

A system operator can "browse" through a file accessed by the mini by viewing pages on the CRT display. "And the user can access his records considerably faster and a lot cheaper than a manual system," Miner says.

The system is available on lease, lease/purchase or straight purchase. Most users prefer lease arrangements, Miner believes and there are about 10 such installations operating around the country.

Videofile may not be the most exotic large storage system available, one user adds, "but at least you don't have to look too hard to find an operating system if you want to "kick the tires!"

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Editorial

Now It's the Users' Turn

While we have no evidence that IBM deliberately panicked the users and the financial people by its actions involving Data Recall, neither do we have any evidence that IBM made a reasonable effort to settle the dispute privately and without publicity.

Whether it was deliberate or not, the damage has been done. Many users and financial people are now leery of the independent suppliers because they are afraid IBM may suddenly move against them in some unexpected way.

If the users want to see prices continue to come down at the same time performance is improved, they must rally behind the independents, thus reassuring the financial backers of these companies.

There are two ways users can do this.

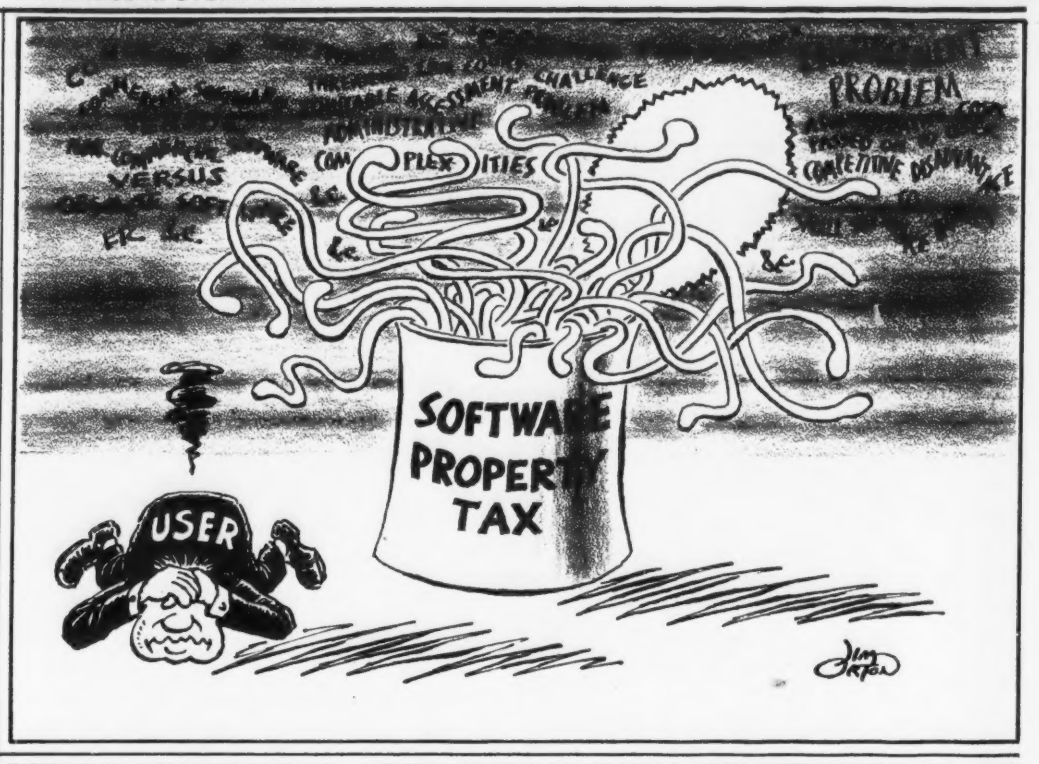
The safe way is to install independent equipment that duplicates IBM equipment, thus saving money and helping the independents with little danger that IBM can do anything about it.

The riskier way is to install independent equipment that offers features and performance not offered by IBM. The greater benefits may be offset by the strong possibility that IBM may retaliate in some way. But sooner or later this battle must be faced and won.

Because if IBM has its way, improved hardware and software will only be released when IBM decides it should, meaning the time when the existing IBM hardware and software has saturated the market.

And it also means that users will have to live with planned obsolescence.

At least they will until a really big "independent" — another country — gets into the act.



Letters to the Editor

Return to U.S. Mails Or Resist Terminals?

I read with interest your coverage of the New England Computer Users' Forum and look forward to the arrival of the Computer Caravan in Chicago. However, the description of Dr. Dixon Doll's keynote speech confused me.

If Doll "chided the computer terminal industry for attempting to sell the concept of distributed computing," was he proposing that the user should do away with data communications and return to the use of the U.S. mails to collect and distribute data? Or was he suggesting users should resist the trend toward the use of intelligent terminals to distribute processing functions?

Most users have clear justifications for their use of data communications. Therefore, it seems doubtful. Doll could have much effect in reversing the trend toward the increasing use of data communications to distribute data processing functions.

Don Berteau

Oak Park, Ill.

Doll was referring to the inability of communications services to support the distributed computing function. The terminals were available but the lines were not yet reliable, hence the concept was premature, Doll said. Ed.

103Es Not 103s

Your readers should be made aware of an error in reporting what I said at the New England Computer Users' Forum. I'm refering to the March 1 article where it was stated that: "At MIT five Bell 103 data sets were replaced with independent modems for a savings of $59,000/yr."

I'm certain your readers are wondering what price we were paying for 103s to gain such a savings. After all, most people think of the 103A as the 103; and, as you know, they rent for $25/mo.

What I did say was, "Last February to March 1971, five Bell System Model 103E multiple data cabinets and associated data sets were replaced by five independently supplied multiple data set racks/cabinets and associated sets." A fully equipped 103E (cabinet and 40 data sets), and ours were, rents for $1,075/mo. Quite a difference from the above.

If you are wondering how I came up with the $59,000 figure, the answer is five 103Es at $74,500 less installation/purchase charges for the replacement of the 103Esand the cost for DAAs.

Again, thanks for allowing me to participate in the CW Forum. It was an interesting experience.

Morton Berlan
Communications Officer
MIT
Cambridge, Mass.

Editor's Note

Last week we printed a photo of what was clearly a tape drive and called it a "disk drive" in the cutline. We have already run the writer's little finger into the pencil sharpener as punishment, and he promises to be more careful in the future.

Making Programmers More Professional

By Dick H. Brandon
Special to Computerworld

Viewpoint

I am often accused of being "anti-programmer," a vague accusation to which I usually respond that some of my best friends are programmers. In fact, nothing could be further from the truth: some of the best years of my life were spent as a programmer, on the IBM 705, 650, 1410, etc..

I do believe, however, that programmers need to become more professional, and need to establish a programming discipline and a programming ethic — totally separate and distinct from systems analysts. If this is not done by the industry, on an industry-wide basis, the result will be a continuing debasing of the programmer, inevitably resulting in militant unionism.

The signs are all there. There is unemployment among programmers for the first time. There is increasing emphasis on and understanding of the "systems" function, thereby further reducing the need for programmers.

Programmers are exhorted to become analysts, and career paths are designed with analysts as an end point, even though many programmers will not qualify for analysis, or will be unhappy in performing the tasks of analysis. Many data processing people (inaccurately) refer to programmers as "coders" and further contribute to a sense of inferiority.

One does not counteract this simply by escaping into systems analysis, especially if the escape won't work. The proper attitude is to enhance the programming profession — to provide the requisite professionalism and a meaningful career path for programmers.

The first step is to circumscribe the programming function, to clearly separate it from systems analysis, and to define the interface. This is mandatory, if we are to succeed. The separation is a first step in establishing a clear identity for the programmer, and in giving him a sense of belonging. It is also necessary to eliminate the myth that one person can successfully do both systems analysis and programming.

Other primary reasons for the separation are:

- The fact that totally different skills and prerequisite characteristics are required for the two jobs.
- The extensive and different training needs of each job, which make it impractical to teach one person both skills.
- The fact that the jobs represent a basic conflict of interest — in that the analyst must optimize the user's needs whereas the programmer is concerned with machine optimization.
- Basic economics, which suggests that a person doing coding or testing is worth less than one doing design or communicating with line management.
- The enforcement of documentation, as a principal means of communication between the two functions.

It is clearly possible to separate the two functions, clearly and without controversy. The analyst works at the systems level, and thus is responsible for data gathering, feasibility analysis, data analysis, design and specification development.

Similarly, the programmer starts at the point where the system is divided into its next logical elements: programs. He is then responsible, for each program, for logical analysis, coding, test planning, testing and documentation.

Upon completion of all the programs, the analyst and the programmer both participate in systems integration.

The tasks ahead are clear, assuming we can ever obtain unanimity in our industry, and further assuming that some organization is willing to assume responsibility. We must:

- Define the scope of systems and programming.
- Prescribe the tasks of each function.
- Define the point of interface.
- Establish standards for the communication between the functions.
- Establish a uniform methodology and a discipline for each.
- Define separate career paths and professional goals.
- Establish the necessary ethics for each.
- Disseminate the results to the professions.

Brandon is president of Brandon Applied Systems, Inc., New York.

Let's Not Dismember IBM, But...

Let's Stop Scalpel-Makers From Teaching Surgery

At the beginning of this year I wrote that my style was changing, because the data processing profession was changing. I said I would not be putting quite so much sugar on my comments – I would be more forthright.

Later in January in Cleveland at one of the most delightful DPMA meetings I have attended I was asked about this comment, and asked whether it meant I believed the profession was maturing, and even more, how mature I believed it was.

The Taylor Report
By
Alan Taylor, CDP

It was an excellent question, and one that I would like to thank my unknown questioner for. I answered that I did believe we were maturing, and that I estimated that we have now achieved the status of a teenager who had sufficient intelligence – we had to listen to him and learn from him – but who was not yet sufficiently stable to take full responsibility.

In that busy evening there was no opportunity for me to expand the answer to cover the next question that would undoubtedly have followed. The question: why did I feel the profession was not yet mature, what evidence did I have for it, and what had to be done in order to mature? These are some of the most important questions before us, and I think they are now worth discussing.

Death of Divinity

The major change in the past two years has been the end of the reign of the big computer manufacturers as the priests of the data processing religion.

As recently as two years ago it was heresy to question the words of the local friendly salesman (except occasionally when you might consider wandering from one religion to another). The salesman was the font of all knowledge, and he could, on occasion, make you afraid that merely asking questions could hurt your career. If you felt like replacing some of his equipment with someone else's that was functionally the same, you first asked him his opinions – you practically asked his permission! The relationship was one of pure dependency.

Criticism at this time had to be raised rather carefully. As is the tradition during the reigns of priestly regimes, or kings by divine right, the criticisms came indirectly through ballads or the jokes of the court jester. So it has been here. There were a few of us jesters around.

But now matters have changed. Now we can admit that the computer manufacturers are open to question, because we have noticed there are other hardware manufacturers who can apparently supply the same peripheral systems. So the absolute divinity has gone from the big manufacturers. We still respect them, we learn from them, we use them, but there is not quite the same awe as there used to be.

This is why I believe we have matured.

Failure to Protect Employers

But at the same time the profession has grievously failed. We have, for instance, a major responsibility to our employers – to the people for whom we run these million dollar toys and for whom we provide programs. We have failed them, and that is a fact.

We have failed because we have not sufficiently warned them of the dangers involved in the use of computers. They have come to us and asked: "Is it feasible to use a computer for such and such an operation?", and we have simply answered yes.

We have not answered, "Yes, it is feasible, but because the manufacturers do not warrant their hardware, and because of the hundreds of faults in the software, and because of the time it takes us to change anything, there are dangers which may well outweigh the advantages of doing so."

How many recommendations and justifications of computer systems have you seen that have really spelled out in terms management can understand just what might happen, and what the cost to the organization might be! Very few.

And we have failed to see that the equipment with which we are supplied is used to its fullest. Here the failure is not so much in the installation, but in those that educate us. System 360, for instance, came out in 1964, and has yet to have its microcode properly used. IBM has known this. In one of its confidential reports it noted the Model 40, for instance, could do table search programs over 10 times faster than it was doing!

There are many other things that microprogramming properly applied can do. There is no need to change to System 370 to obtain these advantages. There is no need to involve the user in large expenses. He had already obtained and paid for the hardware; he just did not get the use of it for a full computer generation.

Not merely did he not get the use of his equipment, but he was effectively prevented from realizing he was not getting full use of it! And that, more than anything else, is where the profession has failed.

Even more we have failed in our role as citizens of a society. Computers are important. There are good reasons for believing that the old fears of computers replacing large numbers of workers are coming true very quickly – probably within the next two or three presidential administrations! This is news which can only be properly understood within the profession, but which people in the labor movement, and in politics, must be made aware of urgently.

We in the profession have had this knowledge available, and we have suppressed it, carrying on without keeping the society informed. This is why I do not believe we are more mature than the teenager.

How then can we become mature? Here we have to look to find the causes of our lack of maturity. We know it is not lack of ability. Nor is it lack of willingness, for I find a great willingness among the profession to look at new problems when there is a reasonable chance the resources will be made available to allow a proper study. The simple fact is that the resources have not been available (or at least we have not believed that they are available) to study questions that might have previously involved us in professional heresy.

In January this year one of our major EDP educators, Thomas Cashman Jr., started a newsletter with the question, "Data Processing Education – a Decade of Failure?".

I think he hit it on the head. Our professional problem has been the lack of leadership in the educational and academic fields.

In many cases it has been found that the only way academics could get the information they wanted for their own research was to keep it secret, either by excluding other members of the profession (as was done in microprogramming) or by hurriedly classifying material when it became possible that some embarrassment might occur (as was done with a user group/IBM study which revealed that superhuman computers may be in large-scale use in our factories in 1980, and that the industry was planning to obtain tax advantages so as to lessen the cost)! (see figures)

The academic community has failed to see that our justification studies should bring out the dangers involved in data processing to an organization, as well as the advantages.

In fact, the education community, perhaps in its overeagerness to get an adequate supply of this expensive hardware, has failed to protest while data processors were taught by the suppliers of their equipment, instead of by practitioners of the art.

Just how important this fact really is can be seen when we consider the equivalent would be learning surgery from schools set up by scalpel makers, or medicine from those run by the drug industry!

This flight from reality is particularly tragic because in fact the data processing industry forms a fascinating, productive and novel area for real academic work.

Data processing is, perhaps for the first time on a world scale, the modern goose that lays the golden eggs. For the first time we have products which do not wear out. We have products which have no product cost. We have in our hands a treasure of the ages, and one which has defied the understanding of the ages.

How can the academic community find a greater challenge than in understanding this fascinating riddle and in helping us be productive without destroying both ourselves and the golden goose?

It is to be hoped that in the future the challenge of the real study of data processing will attract the adventurous in academics/education, and that they will, perhaps as a byproduct, perhaps as a duty, set up for us educational classes that will really be medical schools instead of barbershops, and which will then allow the rest of the profession to perform its duty both to its employers and to the society.

For this is where the key to our continued development lies, not in the dismemberment of IBM as such, as Joan Van Horn and Telex Corp. want, but instead in the realization of the dangers involved in entrusting the education to these manufacturers.

We should realize perhaps that the complaints such as those put forward by the president of National Bankamericard [CW, Jan. 26], might not have taken place if we had previously removed education from the manufacturers' control. This is where the primary danger to the profession lies.

Hopefully we will soon get our medical schools and put the scalpel-makers in their place.

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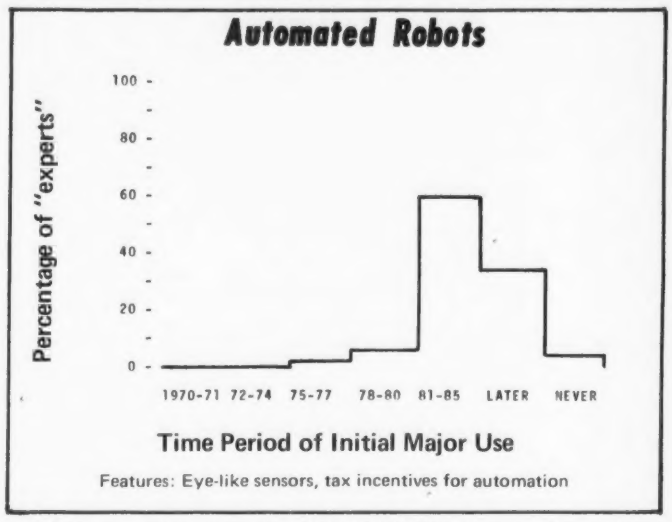

This figure, taken from the 1970 IBM/Guide Report, shows that the computer "experts" expect robots to be here in less than a decade. The report text indicates these will have "superhuman" capabilities, and be used to replace human workers. The legend notes that tax advantages to assist in this replacement are counted on. The social implications are great, but the computer industry apparently prefers to keep the matter secret, rather than reveal the problem in time for proper discussions. Do you think the workers whom the superhuman robots will replace agree? Or the taxpayers who have to consider the costs of unemployment?

	Model 40	Model 50	Model 65
Matrix multiplication	1.47	1.59	1.49
Polynomial evaluation	1.64	1.45	1.34
Table search	11.8	13.8	10.0
Byte test	10.8	6.2	5.0

Performance Improvement Ratio Without Hardware Changes

This figure, taken from Husson's *"Microprogramming, Principles & Practices,"* 1970, Prentice Hall, shows that before the 370 was announced IBM knew large-scale performance improvements were possible without any hardware changes – and that in fact the systems IBM offered in both the 360 and 370 Series were being kept down to 10% of the real hardware capacity in table searching. This was general knowledge in some academic circles for years – but the users were left in ignorance of the capabilities of their hardware. I wonder whether the people who paid for the system would approve?

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Obstacles in Indonesia

How About a Computer Lost at Sea!

By Bernice Pantell
Special to Computerworld

DJKARTA, Indonesia – From the edge of the jungle in East Kalimantan to the borders of the formidable Atjeh tribes in North Sumatra, computers are part of the daily business for Pertamina, the national oil company of Indonesia.

Indonesia has special characteristics of geography, communications and culture which make computer processing an invaluable tool for growth, and Pertamina is leading the way in using the computer as a tool, though it is not by any means the only user.

But there are many obstacles to such an operation. Such simple things as telephone calls cannot be taken for granted. Downtime is a big hazard when there are no communications. And what about the implications of a computer lost at sea, as was the case when North Sumatra's 360 was ordered from West Germany, arrived on time in Singapore, but was misplaced "somewhere at sea" for months afterwards. When it finally arrived in North Sumatra, it turned out to be a 64K system rather than the 32K ordered. Company officials were too relieved to give much thought to the possibility that some other company might have a 32K instead of a 64K.

Complicated Schedules

The daily business includes a refinery system that schedules production from crude oil produced locally or around the world; an accounting system with so many currencies a table look-up and currency codes are used for postings to ledgers; an inventory system with three-year delivery dates that are not uncommon; a personnel system that keeps track of more than 40,000 employees and 200,000 or so dependents; and a medical system that watches the health of the workers.

Pertamina is not just a company, but a community. The data processing systems up and running and in planning reflect the size, scope and importance of one of the largest income-producing activities in Indonesia.

IBM Training Course

Pertamina's DP coordinator, Ed Soenredi used his Master's degree in business administration from the University of Indonesia and an intensive IBM training course in the U.S. to build a formidable computer operation. He started in 1966 when the first computer, a 1401, was installed in North Sumatra, and continued in 1968 with 360/30s replacing tab systems taken over from Shell Oil Co. by Pertamina during the Sukarno regime.

Pertamina has a main computer center in downtown Djkarta and three centers on far-off islands in North Sumatra, South Sumatra and in Kalimantan. The headquarters computer system includes a 128K 360/40 with 2314 disks and four tapes.

The outlying units have standard configurations: 360/30s with 32K, 2311 disks and four tapes each. These computer centers are not hooked up to each other yet, but remote terminal processing and computer communications are planned. Pertamina has trained more than 25 programmers so far in a program that is just now reaching its stride.

Two applications – financial accounting and inventory management – are standardized in all computer centers. Someday all company-wide applications will be standardized, but it is a slow process.

Many of Pertamina's units were originally operations of foreign oil companies. When they were absorbed into the Pertamina family, the personnel and procedures of the original companies were taken over intact.

Complex Whole

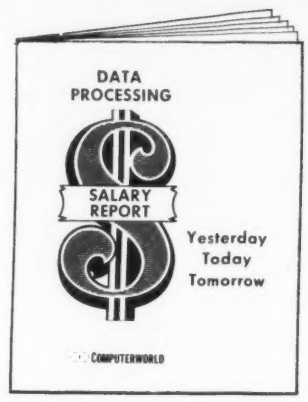
It is not just coincidence that DP is an important part of this process. Soenredi was backed up by an enlightened management which saw the possibilities and seized the opportunity to use computers as an integral part of the greater task of forming one company out of the many parts.

Dr. Ibnu Sutowo, Pertamina's president, should be credited for supporting his DP staff at a time when the idea of placing computers in jungle-bordered oil fields was considered a pipe dream.

IBM has been maintaining Pertamina's computers and keeping personnel and equipment up-to-date with Soenredi's forward looking applications and requirements.

One example of the progress being made is that the computer is soon going to work on cutting down the three-year delivery schedules. A central logistics management system is expected to isloate lagging supply actions from the thousands that are processed every day. Pertamina's logistics management system will be the most modern in the country and probably in the region.

DATA PROCESSING SALARY REPORT



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Consortium Members Meet On Common DP Problems

MONTEREY, Calif. – One hundred and fifty institutions of higher education will have the opportunity to share their experiences and theories on common DP-related problems – from use of CPUs for administrative functions to the teaching of computer science – at the annual meeting of the California Educational Computing Consortium (Cecc) next month.

The work of the two-year-old organization is carried on by seven special interest groups, each of which conducts seminars and workshops related to particular areas.

Thus far, the consortium does not have any hardware of its own, and member institutions utilize their own equipment.

In a recent meeting, Cecc members examined the "articulation" or coordination of curricula between the state's junior colleges, four-year colleges and universities.

DP courses in the junior colleges have traditionally been considered vocational education,

Education

but the expanding interest in "computer science" by the four year schools is forcing a reappraisal of that aim, according to El Camino College's Robert J. Fedrick, who chairs the Cecc interest group on teaching of computer science.

Prison Has 1130 For DP Training

YARDVILLE, N.J. – Inmates are learning RPG, Fortran and Cobol, and unit record and console operation, at the Youth Reception and Correction Center here. The "hands-on" training program uses the center's IBM 1130 and related equipment and lasts 48 weeks, divided into three phases. Sixty men were trained in the first year of the training, and 40 are in the current class.

Since the project's success depends on acceptance of the center's "graduates" by the business community, firms interested in interviewing trainees should contact the center's DP instructor, Samuel Fussell, through P.O. Box 1, 08620.

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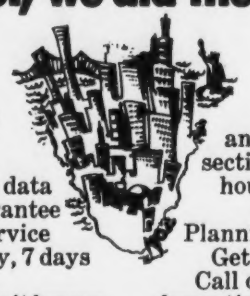

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Microprogram Seminars Set

SANTA ANA, Calif. – Microprogramming has become an active system tool as well as a means of implementing software on a CPU. To emphasize the changing role, Microdata Corp. is conducting a series of no-cost seminars for systems and programming groups in various cities.

Feasibility, design, programming and implementation of microprogramming systems will be covered, and each seminar will include equipment demonstrations, discussions, slide presentations and lectures.

The next seminars will be in Minneapolis on April 25-26; in Philadelphia on May 23-24; and in New York on June 27-28. Further information is available from the company, at 644 East Young St., 92705.

Film List Ready

NORTHFIELD, Vt. – A revised *Directory of Films for Data Educators* has been compiled by Arthur H. Pike of Norwich University, and published by the Society of Data Educators. The directory contains detailed descriptions of 350 files, sources where they can be rented or purchased, rental fees and the running times.

The directory may be obtained for $2.25 from the society, 2-76 Union, 05663.

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Random Notes

Enhanced Boothe Spooler Cuts Processing Time 30%

THOUSAND OAKS, Calif. – A new version of the Spooler package from Boothe Resources International takes 6K bytes of core but increases processing throughput by 30% over the older 4K version, according to the company.

The new Spooler operates in a foreground partition under DOS/360 and requires 20 to 30 cylinders of direct access space in addition to core. Control functions modify the first in/first out logic of the $4,000 package, a Boothe spokesman said from 15432 Ventura Blvd., 91403.

New 'Super/Pay' Uses 48K Core, Runs on Range of Mainframes

LOS ANGELES – Version 2 of the Super/Pay payroll-personnel system from California Datalease operates in a 48K environment on IBM, Honeywell, RCA or Burroughs mainframes, the company said.

The system is said to be less complex than the original Super/Pay, which supported 30 earnings and deductions catagories, five state and local and two federal tax segments, but took 80K bytes of core. Version 2 can be used by multiple divisions with different processing "profiles," and sells for $960, from 6430 Sunset Blvd., 90028.

Receivables Processed by NCR

DAYTON, Ohio – Users with fully committed in-house CPUs can still have their customer accounting under DP control with the Open Item Accounts Receivable System, now available at NCR data centers

Virtually any type of input, including optical-print paper tape, punched paper tape, punched cards or magnetic tape, can be used. The service generates monthly customer statements and a range of management reports. Processing charges depend upon volume and types of reports desired, subject to a $150/mo minimum.

Canadians Use Nutrition Package

REXDALE, Ontario – Producers of animal feedstuffs can optimize feed formulation costs and ingredients usage with the Nutrition Management Service program implemented on the Com-Share Ltd. time-sharing network.

The programs were developed by Maddy Associates Inc., of St. Louis, Mo., and are available on local dial-up lines in most major cities in Ontario and Quebec, Com-Share said from 41 Voyager Court North.

Newsletter Tells How

DP Project Pitfalls Can Be Avoided

By Don Leavitt
Of the CW Staff

CAMBRIDGE, Mass. – If management is alert, early in a major software development project, certain danger signs can be recognized and corrective action taken in time to save the project, according to ADL Systems Inc.

In a newsletter to senior executives, the firm warned its readers to be wary of:

- The slippery specification.
- Excessive confidence.
- The missing manager.
- The last-minute test plan.
- The "lack of resources" excuse.

While almost every project starts with a set of specifications, too many users break the development into minute steps, each of which may include design changes from the prior step, the company said.

A preferred approach is to plan systems efforts in major steps, during which design specifications are fixed. Important changes or additions can be accumulated in parallel with the work effort, the author said, and designed into successive stages after each milestone is reached.

Project managers must be executives fully knowledgeable in the details of the job to be done, with sufficient authority to get it done, the author said.

Although most software developers have a test plan, testing in the latter phases of a project is too late in terms of discovering the little problems that cause delays and overruns. Instead, users should provide adequate time, progressive documentation and defined standards for testing each component of work as it is completed, he added.

Lack of computer time to test programs and experiment with file structures, diagnostics and other programming techniques wastes time and money, and for little reason, he said.

The newsletter, called *The Casebook, Finishing the Software Job,* is distributed without cost by ADL Systems Inc., Acorn Park, 02140.

'Problem-Oriented Languages' Put Programming in User Terms

WALTHAM, Mass. – Users can write programs in terms they understand and without the artificial restraints of conventional languages, with Problem-Oriented Languages (POLs) from Softech Inc.

In most cases, POLs will be simple command-type processors which let the non-programmer work comfortably with the computer, but they can be source program generators, interpreters or macroprocessors for the more experienced user, Softech said.

Whenever possible, the POL will be created from pretested modules which control both the time and quality of the production process. This means that few POLs would take more than six months to develop.

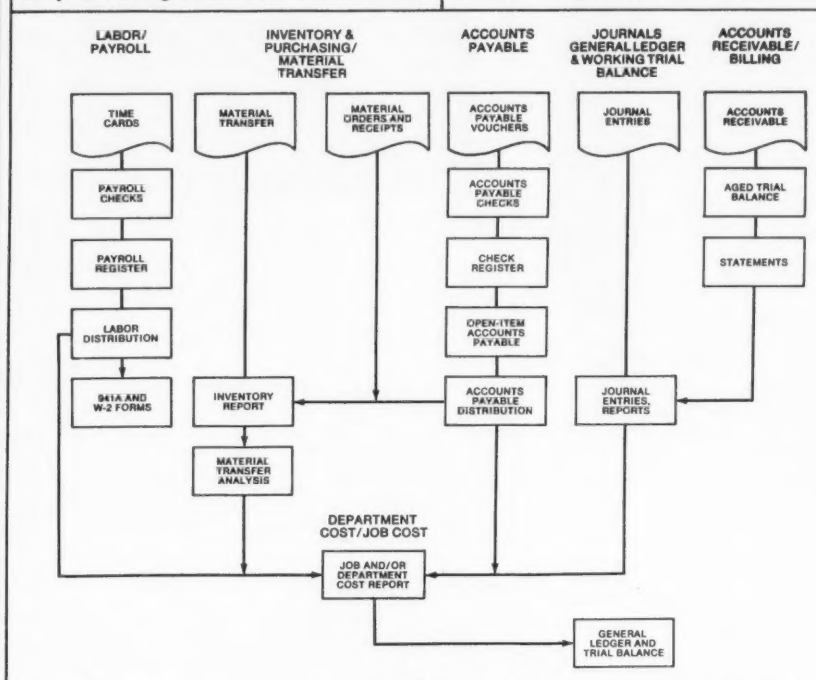
POLs are built on the assumption that they will be modified or enhanced to meet changing user needs.

Softech will generally use PL/1, Cobol, Fortran or its own AED-O language to implement POLs. The choice of program implementation language is transparent to the POL user, the company said.

Diagnostic and debugging capabilities will vary with the type of POL.

Once modules have been developed that meet the generalized needs of an industry, basic POLs for that industry should be available for about $4,000, and completed tailored POLs, based on the available modules, might cost no more than $8,000, a Softech official estimated.

The company is at 391 Totten Pond Road, 02154.



Business Applications Linked

Businessmen can have flexible but effective controls with the General Business System (GBS) software on the Boeing Computer Services (BCS) network. The system provides interfaces so applications can be run separately or in combination with one another. Thirty-two management reports provide a broad range of support. BCS can be reached through P.O. Box 708, Dover, N.J., 07801.

NIH Funds Support Statistical Package

RALEIGH, N.C. – A majority of the statistical techniques and procedures used in the statistical analysis of data are included in the Statistical Analysis System (SAS) developed at North Carolina State University, under a grant from the National Institutes of Health.

The present version of SAS is described as an integrated language consisting of data input statements, transformation statements, subsetting operations and linkages to procedures to handle the analytical procedures.

SAS runs on IBM 360/370 CPUs operating under OS and having at least 150K bytes of main memory. Each release is available to universities and other public service institutions for $35, and to commercial users for $100, from the Institute of Statistics, P.O. Box 5457, 27607.

"I almost bought the wrong Job Accounting System..."

COMPUT-A-CHARGE

An automatic system for billing computer users which solves the multi-programming billing problem.

A few weeks ago, Value Computing announced, in *Computerworld*, the availability of Comput-A-Charge, an automatic system for billing IBM DOS/OS computer users which solves the multi-programming billing problem.

The response has been extremely enthusiastic. From one of the first customers:

"I almost bought the wrong job accounting system. In my attempt to save my company time and money, I was about to choose an over-priced inadequate system. Comput-A-Charge stopped me from going down a blind alley. With Comput-A-Charge, I can go into other systems, like scheduling and tape control."

Daily: Summary on Jobs . . . Idle Time . . . Multi-Programming Graph . . . Class Utilization . . . Device Utilization . . . Shift Analysis

Periodic: Device Utilization Graph . . . Device Utilization . . . Job Utilization . . . Application Utilization . . . Major Application Graph . . . Total System Summary

Billing: By Core Used, Core Requested, CPU, I/O's, Card Read, Lines Printed

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_____ Send information about computer scheduling and control system
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One day the board chairman may ask if you've considered all the alternatives

Such as using existing software instead of developing custom software. Did you save time by using it? Did you save money? What about reliability and efficiency?

Yesterday you were right. The answers were no. Today, perhaps you should think again. They're yes.

Did you know that today you can choose from over 7,000 existing routines, programs and systems? Chances are one will suit your particular application.

The perfect package for your application may not be available. But it makes good business sense to learn more about those which are. Especially if you deal with a thorough board chairman. He's probably as concerned about time and cost effectiveness as you are.

One of our affiliated consultants will be happy to locate, review, evaluate and advise you concerning the package or packages best suited to your needs.

Write or phone us today. The few minutes it takes can save you many months of hard work and frustration.

And it can save your chairman a lot of sleep.

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We are actively seeking affiliations with consultants in all cities. Write or call for full information.

Three Systems

Choice of Monitors Matches Mini Uses

PITTSBURGH, Pa. – Three new software systems are available for the Westinghouse Series 2500 minicomputer, each suited to a particular type of application and designed for one of the three W-2500 configurations.

For communications processing, Monitor C interfaces for synchronous transmission to and from CDC and IBM operating systems. Monitor II is a small monitor, intended for minimum core requirement and single-task processing. Monitor V is a real-time multitask monitor with interface capabilities to a wide range of peripheral devices and process I/O.

Monitor C ties W-2550 terminals to a variety of host computers, accepts special handlers and runs in approximately 2,000 words, according to a Westinghouse source.

The mini-based terminal with Monitor C can be used independently for batch process and for real-time process controls, interfacing with the larger host computer only when necessary.

Monitor II is a conversational monitor for a stand-alone configuration for engineering, scientific and general-purpose applications. It is a batch operating system and a development tool for real-time task preparation. The 1,100-word system runs in 4K of core. A file management system is optional with this software.

Monitor V is a general-purpose system that can be used for real-time process control. A W-2500 with 20K words of memory can hold the 8K monitor, handle core-resident and disk control programs in 8K and run Fortran background control programs in 4K. The system handles up to 1,024 tasks. Using JCL, batch-type tasks can be run in the background during real-time operations. A file management system is standard with this package.

Westinghouse is at Gateway Center, 15222.

Package Aids DOS Transient Use

CUPERTINO, Calif. – DOS/360 users can get a better idea of how effectively they are utilizing their hardware and software, and how they can improve the situation, with new measurement "tools" from Boole and Babbage.

B&B has added an analysis of File Oriented Wait Time to its Program Performance Evaulator for DOS (DPPE), and DOS transient analysis for its Configuration Utilization Evaluator (DCUE).

'Significant' Improvement

The reports of distribution of file oriented wait time, and percentage of time spent in file oriented wait state offer a deeper analysis of CPU wait time caused by I/O devices or channels already in use. Users can experience "significant" improvements in program run times by modifying their use of those files with extensive I/O wait times, the company said.

Users of the DCUE features gain more efficient operating systems, by recognizing those DOS transients which they are using heavily, and by shifting them to a buffer area in core so that they do not have to be loaded from disk each time they are needed.

A new physical and logical transient load sub-report, generated by the DCUE system, indicates the number of loads for each transient.

Once this report is analyzed, a new program, the DOS Transient Buffer Manager, can build and then maintain a memory buffer of those transients specified by the user through a control statement.

The DOS Transient Buffer Manager could be used by itself if the user feels he has a means other than the Transient Load reports from DCUE to determine which transients ought to be maintained in the memory buffer, a company spokesman said.

B&B is at 18990 Homestead Road, 95014.

Fortran Business Routines Available

SANTA ANA, Calif. – A subroutine package which facilitates preparation of commercial data processing programs on minicomputers using Fortran has recently been released by Panatec, Inc.

The package contains 30 routines which perform variable-length decimal arithmetic, editing for preparation of outputs in commercial formats, conversion to and from alphanumeric, decimal or floating point formats and various utility functions.

The Panatec package is compatible with most minicomputer Fortran IV systems, incouding those of DEC, Data General, Varian and Hewlett-Packard. The subroutines are also CALLing sequence compatible with a similar IBM 1130 package. They could, in fact, be adapted for use on almost any mainframe processor that supports Fortran IV, the company said.

This package costs $800. The firm is at 1580 East Edinger, 92705.

The Novar 7-70 Data Collection System receives data from Novar terminals via phone lines and records it in IBM computer compatible format —9 track, 800 bpi—on 8½" reels. Will also transmit data to another Novar terminal, another 7-70, or to a computer. Complete with software.

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If you're building a career in computers, THE JOB MARKET is the one tool you won't want to be without. Its comprehensive coverage of computer job openings from around the world supplies the vital information YOU need to make important career decisions. A half hour a week with this remarkable publication, and you'll know what's happening throughout the computer industry, both at home and abroad. NOW, with the help of THE JOB MARKET you can take a look at other opportunities, and compare YOUR job with positions, salaries, companies, benefits, and locations from around the world. **AT LAST!** . . . You can finally afford to be selective about the future you want for yourself. And with THE JOB MARKET at your side, you can do it all in the privacy of your own home.

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If your skills are *NOT* in demand, **THE JOB MARKET** will show you how to adjust to the industry's needs, and how to fit more effectively into tomorrow's job market. If your skills *ARE* in demand, you'll find in **THE JOB MARKET,** a world of computer opportunities that you never knew existed . . . hundreds of better jobs, with better salaries, in better locations. And they're all yours to discover . . . **THIS WEEK** . . . and every week, in **THE JOB MARKET.**

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Any tape error can cost you recycling time and dollars.

That's if you're lucky.

(If you're not so lucky, a tape goof can lose important data forever. Then what's the cost?)

So we've been working to come up with a 3200 fci tape that would reach you error-free, and would remain error-free. In other words, a tape that's too tough to trick.

We now have that tape. BASF/2000 A.D.

BASF/2000A.D. is coated with a smaller-particle oxide dispersion that we developed in our own labs. The smaller particles can be applied more evenly, more compactly, more completely than ever before possible. Result: greater sensitivity and uniformity, in a thinner coating.

The thinner coating, in turn, means a more flexible and flatter-lying tape. Result: better head wrap, better capstan control, better head contact.

BASF 2000 A.D., a new tap

What about durability? Good question. Even though our new BASF/2000A.D. coating is thinner, it's also harder than conventional coatings. And less abrasive. Result: less head wear, longer tape life, greater longtime reliability.

And finally: our new BASF/2000A.D. base is a premium polyester, tensilized in both directions. Edges are the cleanest in the industry, cut to a tolerance of ±.001″ (vs the industry standard of ±.002″). We QC every step, from milling to packing. And we certify *every* tape.

There's one thing we *don't* do to our latest tape. We don't sacrifice any of the push for perfection that has always characterized our previous tapes. BASF/2000A.D., in other words, is quality added on—not a trade-off.

As you can see, a tough way to make computer tapes. But you can see something else, too: it can sure make life easier for you. Why not write for more details?

BASF Systems, Inc., Computer Products Division, Crosby Drive, Bedford, Mass. 01730

Please send me more information about BASF/2000 A.D., your tough new tape. But I warn you: I'm tough to convince.

Name_____

Title_____ Company_____

Street_____

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Phone_____

pe that's too tough to trick.

BASF

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VENTURE SYSTEMS

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Now offers relocatable hardware...

dos-allocate

When Venture Systems introduced its Dynamic Tape Allocation System (DTA) last fall, it marked a new level of software enhancement for the IBM 360/370 DOS user. At a time when hardware evaluations were occupying management's activities, we offered an alternative: A system to reduce the need for additional tape drives or help justify the elimination of current drives.

Great! But why stop there?

Why not allocate all peripheral units?

And so we did. We call it dos-allocate. Designed to relieve the burden of assignment, scheduling and utilization of peripheral units, dos-allocate is transparent to the user with no change in application programming. Now you can continue to make normal unit assignments, but you are completely relieved of concern over possible conflicts in assignments because when a conflict does occur, the operator is advised through the console of the newly assigned device. All subsequent assignments within a job that reference a system-reassigned device will be reassigned to the same device.

Here is what this means for you.

- **The scheduling function will be less complicated since the number of devices is the major concern rather than the physical unit assigned.**
- Partition switchability would result without the need for changing job control statements.
- **The operations manager will experience greater flexibility in adjusting the schedule to meet adverse situations.**
- Operation intervention will be eliminated whenever an I/O conflict is encountered.
- *The operator will not have to be concerned with remembering the devices that he has reassigned.*
- **Because of efficiencies through the utilization of dos-allocate, elimination of one or more peripheral units may be realized.**

You can add more benefits to the above by trying dos-allocate on your system—free. If you are not completely satisfied—there is no liability. We are confident that you will find it to be more than you expected.

Besides our program products, we provide complete software consulting, accenting a full support program for 360/DOS users.

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SYSTEMS **COMPUTERWORLD** PERIPHERALS

March 22, 1972

Bits and Pieces

Print System Connects Drives, Printer to Nova

MAYWOOD, N.J. – Ultimacc Systems, Inc. has developed an off-line printing system, based on its Ultimacc 514 controller, to connect one to four 2314-type disk drives and a line printer to a Data General Nova.

The system, with a 24K byte memory, is compatible with IBM DOS software. It features automatic fail-safe record addressing, hardware error checking and a variable record length of up to 2K bytes.

The hardware includes a 24K byte Nova 1200, either a 300 or 600 line/min Mohawk printer, 2314-compatible Century disks, controller and software and is priced at $59,750. Maintenance is about $350/mo from Honeywell. Third-party leases are available, with a 60-month lease priced at $1,200/mo. Delivery is 90 days from 9 Brook Ave., 07607.

Teletype Terminals Connected To Data Sets With Interface

VERONA, N.J. – The EIA Interface Coupler Model D-720 from Universal Technology, Inc. allows the interconnection of Teletype terminals to data sets conforming to EIA standards. The D-720 couples teleprinting equipment to 103A, 103B, 103C, or 103F Bell data sets or equivalents.

The EIA Interface unit accepts data from the signal generator of the teletypewriter and converts these to bipolar signals for use by the data set. Bipolar signals from the data set are converted to current/no-current signals of 20 mA or 60 mA for use by the teletypewriter. The device also accepts control signals from the data set and converts the on and off conditions to signals for driving control devices.

The interface is priced at $99. It is available from stock from 29 Commerce St., 07044.

Tape Gauges Check Alignment

HUNTINGTON, N.Y. – A line of perforated tape gauges from Computer Accessories Corp. is designed to check the accuracy and alignment of paper and Mylar tapes.

The hand-held gauge checks the alignment and spacing with five sprocket hole pins. Double rows of data holes check the position accuracy of each code.

The 105, priced at $8.95, is used for five-level tape. The 108 for eight-level tape is $12.95. For advance feed teletypesetters, the 106AF is priced at $14.95. The 105M, at $32, is a test tape matrix for five-level tape. All models are available from stock from 211 New York Ave., 11743.

3M Introduces Packs With Locks

ST. PAUL, Minn. – A locking security device has been added to the Scotch brand 911 disk pack product line as an optional feature by the 3M Co.

The Scotch "Lock Pack" design is a lock and key system that prevents unauthorized use of a disk pack which contains valuable or confidential information such as company payroll records, 3M said.

Only by using the key to unlock the pack can it be put into operation on the drive. The optional "Lock Pack" feature is available on purchased disk packs only. List price of a Scotch 911 disk pack with the "Lock Pack" device is $295, according to the company.

Communications Stressed on NCR 399

By Frank Piasta
Of the CW Staff

DAYTON, Ohio – NCR has come a step closer to erasing the distinction between its accounting machines and computer systems with the NCR 399 Series.

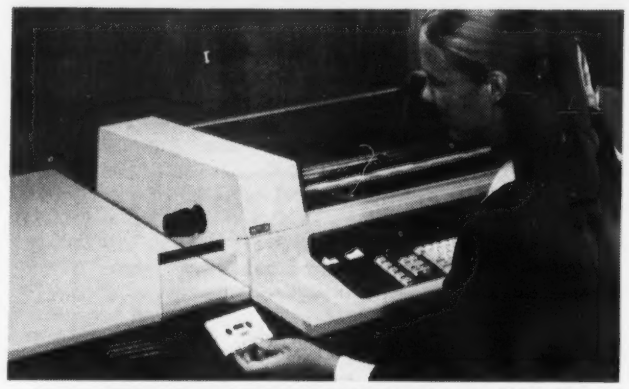
The new machine can be used either as an independent data processing system or as a satellite to a larger computer. In addition, communications capabilities in the 399 enable it to link together scattered office or plant DP operations.

The 399 is built around NCR's small 605 computer with a cycle time of 1.2 μsec. Operations that involve no memory access are accomplished in .6 μsec. Memory is available from 8K to 16K bytes in increments of 2K bytes. I/O data is handled in parallel allowing peripheral operations to be overlapped. Automatic data transfer is implemented.

The instruction set uses a high-level language that minimizes the number of commands needed, NCR said.

Magnetic tape cassettes are the principal means of data storage, and are supplemented by magnetic ledger cards and a keyboard. The cassette system can handle data at 750 char./sec and can be used for data entry as well as storage. The ledger card handling capability is increased by a higher capacity card that provides up to three times as much storage as previously available in NCR systems.

NCR indicated that additional peripherals, such as paper tape and punched card equipment will be available soon.



Tape casettes provide high-speed loading for the NCR 399.

Control lights constantly indicate what is occurring and the system can be programmed to flash printed messages on its control panel to guide operators.

Communications capabilities include both synchronous and asynchronous transmission with either Bell or NCR modems, in batch or conversational modes.

The NCR 399 costs $14,000 in its basic configuration. Lease prices start at $420/mo. First deliveries are scheduled for the fall of 1972, NCR said.

DG Introduces Five Nova Systems for Education

SOUTHBORO, Mass. – Data General has introduced six preconfigured systems, five for use in secondary schools, junior colleges and universities, and one for numerical control tape preparation.

The educational systems are designed around Basic and range from a single-user table-top system to a multi-user, program-swapping system that can handle up to 16 simultaneous users.

The Seminar I is priced at $8,500 and includes an 8K Nova 1220 mini and a teletypewriter.

The Seminar 2, a single-user system that includes a moving-head disk with a capacity of 1.2M words, is built around a 16K Nova 1220 and teletypewriter. It is priced at $24,750.

The Seminar 3 time-sharing system for up to four users includes a 16K Nova 1220, console teletypewriter and four terminal teletypewriters. A system interface to allow expansion of up to 16 terminals is included in the $21,025 price. An expanded version of the Seminar 3, the Seminar 4, includes a 1.2M word disk and a 20K Nova 1220, console and four terminal teletypewriters. It is priced at $35,875.

The largest system, the Seminar 5, includes both a 256K fixed head disk and a 1.2M word moving head disk. Intended for up to 16 users, it includes a 24K Nova 800 Jumbo computer and five teletypewriters, costing $50,975.

In addition to the mini, the system includes a teletypewriter console and a full set of geometric, pattern supervisory and editing commands. It is priced at $5,950. The addition of twice the memory and profiling or contouring commands raises the cost to $7,450. A post processor for any machine tool costs $1,000. First shipments are scheduled for this spring.

'Mark Tape' Holds Source Data

PASADENA, Calif. – Bell & Howell's Mark-Tape data collection system, designed to capture source data on computer-compatible magnetic tape, has been introduced by the company's Electronics & Instruments Group.

The system includes a Mark Document Reader, a digital tape recorder and the necessary interconnecting cabling.

The Mark-Tape system reads pencil-marked, keypunched and preprinted data. Marked data is optically read, translated and written on 7- or 9-channel tape.

The Mark-Tape data collection system can be delivered in 30 days or less. Prices range from $9,300 ro $11,000 depending on the model. Lease rates range from $319 to $396 a month.

CRT Gains Controller, Fuller Character Set

NATICK, Mass. – Incoterm has added a peripheral I/O controller, an expanded character set and new text-editing features to its SPD 10/20 intelligent CRT terminal.

The "Party Line Controller" operates without modems to provide in-house communications between clustered CRTs at speeds up to 9,600 bit/sec on two-wire lines.

Upper/lower case and 96-character Ascii compatibility are provided along with other characters used by Ebcdic and BCD codes.

The purchase price of the expanded character set and text-editing feature is $250. Rental price is $12/mo.

The party line controller costs $440 or rents for $20/mo. Maintenance costs $5/mo. The controller is available on a 90 day delivery schedule from 6 Strathmore Road, 01760.

DEC PDP-8 Series Grows Again

MAYNARD, Mass. – The latest member of the DEC PDP-8 family of minicomputers, the PDP-8/F, is a general-purpose unit intended for end-user applications.

Available with 8K to 16K words of memory, the PDP-8/F includes the CPU, programmer's panel and power supply.

The PDP-8/F is limited to a single Omnibus, resulting in streamlined packaging and reduced power supply requirements, according to DEC.

The price of $3,990 for the 4K model includes a 90-day warranty, installation, two weeks of training and documentation. Deliveries will begin in April.

COM
Instant Microfilm

None of the 360 and 370 computers we've seen is smart enough to tell the difference between a 1443 or 1403 printer and the Quantor 100N microfilm recorder/processor. They wonder why the print output jumps to 10,000 lines a minute. Under $30,000 with software.

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The National Computer Conference That's Coming To You

The Need

The computer age is moving into a new stage. Until now, computer makers have dominated the scene, introducing one breakthrough after another in the state of the art. The time has come to pause and consider the computer user. You need more opportunity to improve on the systems you now have.

The Solution

A Computer Users' Forum, run by professionals and designed to bring regional users together in manageable groups to discuss mutual EDP problems with other users, and with regional and national experts . . . and a chance to study and evaluate new equipment and services that will be shown in the presentations of leading EDP suppliers comprising the Exposition.

The Format

Each Day 9:00-9:40 Keynote address by a nationally known expert – an independent, not a vendor – on the day's main subject. Sets the stage for discussions.

9:40-10:30 Panel discussion led by regional experts chosen for their progressive management principles. Questions encouraged.

10:40-11:45 Workshops – panel members conduct separate workshops. Your specific questions fielded, worked out.

12:15-1:30 Conference luncheon – keynote speaker summarizes chief points covered during panels and workshops.

1:00-7:30 Exhibits open, stay open 'til 7:30. Exhibitors will show the latest in hardware, software, services.

The Subjects

First Day: Data Entry

Keynote speaker; Lawrence Feidelman, President, Management Information Corp., Cherry Hill, N.J.; Editor, *Data Entry Today.*

Panels and workshops will be grouped by these four subjects:

- Keypunch replacement; key to tape, disc and cassette devices.
- OCR.
- Intelligent terminals – distributed processing.
- Direct data entry/source data automation.

Second Day: Data Communications: The Choices

Keynote speaker; Dr. Dixon Doll, Data Communications Consultant, faculty member, Graduate School of Business, Eastern Michigan University.

Panels and workshops will be grouped by these four subjects:

- Communications equipment from mainframe makers and common carriers.
- Communications equipment from independent suppliers.
- Data transmission via private (lines, microwave) networks.
- Data transmission via carriers (lines, microwave).

Third Day: Operational Efficiency

Keynote speaker; Charles Lecht, President, Advanced Computer Techniques, N.Y., N.Y., author of *The Management of Computer Programming Projects.*

Panels and workshops will be grouped by these four subjects:

- Core extensions.
- System/utility software modifications.
- Independent peripheral usage.
- Dedicated systems vs. general purpose computers.

Panel Members & Workshop Leaders

The regional experts who will run the panels and workshops have been chosen from a wide range of firms and institutions. Some will participate in more than one session, depending on their experience and expertise.

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Exposition Sites & Forum Schedule Please Check City Where You Will Attend

City	Location	Dates
☐ Dallas	Market Hall	Mar. 21-23
☐ Los Angeles	Ambassador	Apr. 4-6
☐ San Francisco	Fairmont	Apr. 10-12*
☐ Chicago	Palmer House	Apr. 18-20
☐ Detroit	Cobo Hall	Apr. 25-27

**Monday-Wednesday Schedule*

Please register me for:

☐ **DATA ENTRY – Day One;** ☐ **DATA COMMUNICATIONS: The Choices – Day Two;**
☐ **OPERATIONAL EFFICIENCY – Day Three;** ☐ **EXPOSITION ONLY**

I enclose my check for:
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☐ $5.00 for Exhibits only.

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Line Problems Cited

Study Vindicates Terminal Equipment

By Ronald A. Frank
Of the CW Staff

MAHWAH, N.J. – About half of the troubles reported by teletypewriter users are caused by carrier-provided line facilities and not terminal equipment. Only 5% of reported problems can be traced to operator error.

These statistics are part of a study by Western Union Data Services Co. using figures from its new Termicare maintenance program. Data Services is a nonregulated subsidiary of Western Union and the study covered about 5,000 Model 33 and 35 TTYs which were installed by the company as "foreign" interconnected equipment.

The teletypewriters studied included installations with both Bell Data Access Arrangements (DAAs) and acoustic couplers, according to a spokesman.

Out of 3,800 calls received at the Termicare center during one sample month in 1971, more than 600 were classified as "no trouble found." Included in this category are attempts by users to send a message without completing the call. In many cases a busy or other temporary line problem had been eliminated by the time a service representative contacted the user, a Data Services spokesman said.

Under the Termicare maintenance program, trouble calls are sent to the Data Services Mahwah headquarters via 30 toll-free Wats lines. After checking available trouble records on the user's terminal, maintenance analysts contact the user to pinpoint the cause of the problem. In many cases the trouble is remedied by "talking" to the customer via his teletypewriter. For more serious problems a service representative is sent to the user's installation.

Communications

With the sample month the second largest type of trouble call was caused by modem problems. Of the TTYs reporting, some had built-in modems and others had externally-added modems, a spokesman said. About 240 of the calls for the month were classified as caused by coupling devices, but a breakdown of how many were due to DAAs or acoustic couplers was not available.

Among the trouble reports traced to the terminals, about 500 were related to printer problems. A lesser amount, about 150, was due to keyboard malfunctions or paper tape problems.

Comdata Shows 330s

NILES, Ill. – Comdata Corp. has introduced the 330 Series of modems to replace Bell 103 and 113 data sets.

The 330 can provide up to 16 modems in one cabinet, together with a display panel indicating the status of control and data functions. The 330 Series interfaces with both CBT and CBS Data Access Arrangements for automatic answer applications.

The 330 cabinet is priced at $465 with display panel. Each modem costs $195. A 16-channel automatic answer system on a lease-with-purchase option costs about $88/mo. The 330 is available from stock. Comdata is at 7544 W. Oakton St., 60648.

PSC Staff Hits Rochester Rates

ALBANY, N.Y. – Customer-provided equipment should be interconnected with the facilities of the Rochester Telephone Corp. "at the same rates" now applicable to other services.

This is one of the recommendations made to the New York Public Service Commission (PSC) by its staff after extensive hearings. The staff recommendations are subject to final approval by the commission.

The interconnection proposal of Rochester Telephone was first filed early in 1971, and would interconnect data and other users via a Network Protective Device (NPD) which is simpler in design that the Data Access Arrangement (DAA) required by Bell System companies.

Included in the PSC recommendation is a certification program that would be required for all customer-provided devices connected to Rochester Telephone lines. Business users would be subject to two certification inspections per year to assure that their equipment meets telephone company specifications.

Rochester Telephone, an independent company outside the Bell System, had proposed a separate higher rate classification for users with "customer-owned and maintained equipment" (Coame). But the staff found that a higher rate for Coame users, based on what Rochester claimed would be potential loss of revenue, was not justified.

While most users were pleased with the PSC staff recommendation, some had specific reservations on implementing parts of the Rochester Coame service, if approved.

"If I give the Rochester phone company a piece of equipment to certify, what would it cost and how soon would I get an answer?" one large user asked. Some users also wonder whether New York Telephone Co. will interconnect Rochester Coame users with the rest of the Bell network?

"If the PSC says that Rochester Telephone can use its NPD without harm, it will be tough for the Bell System to object," one data user said.

Bell Working On New Rates

NEW YORK – The Bell System is working on an "entirely new rate schedule" for private line services. The new rates will be introduced on a nationwide basis as soon as "market and cost studies" are completed.

The new rates, which will relate [Bell] charges on specific routes directly to the costs involved," were discussed by AT&T chairman H.I. Romnes in the carrier's annual report to stockholders.

Citing AT&T's past policy of setting private line rates "the same for like distances everywhere in the country," Romnes said "this policy may no longer be viable" in light of the recent FCC order allowing specialized carriers to compete with AT&T.

The Bell System is engaged in a "restructuring of rates generally," Romnes said. "Now it seems fair to ask customers to take on a more realistic share of costs [that they incur]," the AT&T chief added.

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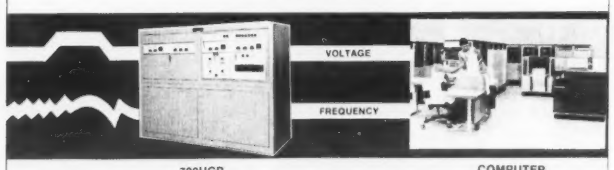

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Special to Computerworld

SYDNEY, Australia – Judges and magistrates in New South Wales will soon be using computers when they sentence offenders, but only to provide feedback on previous sentences made.

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The computer will store information on offenders' behavior patterns, social background, drinking habits, associates, attitudes toward employment and fellow-workers and attitudes toward probation officers.

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Position Announcements

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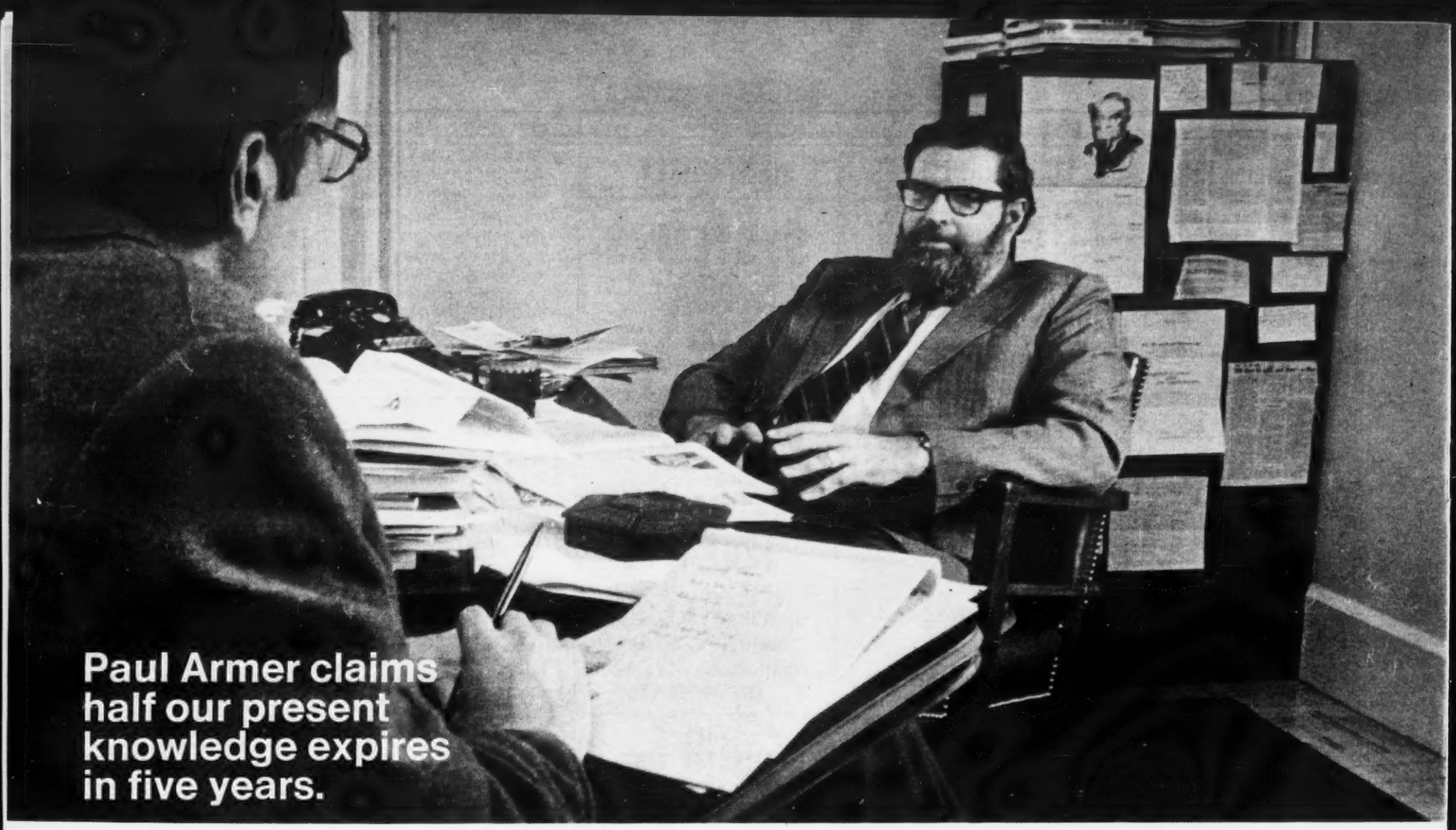

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Paul Armer can pretty well prove his point. He's researching the problem of technological obsolescence in depth with the Harvard Program on Technology and Society. After a 25-year career in computing at the Rand Corporation and as Director of the Stanford Computation Center.

"The hardest thing to know is what you don't know," says Paul. "Today's computer technology is moving at nanosecond speed. My advice to young men and women in the field is to join an association like ACM early in their careers. And then take advantage of the opportunities it offers for self-renewal. I know ACM has helped me greatly over the years."

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CI Notes

Itel Drops Office Unit

SAN FRANCISCO – Itel is phasing out its office products line which has been a "drain on the company" and is selling off one of its disk drive subsidiaries.

Phasing out the office products line will result in a loss for the year of about $6 million, the firm said, while the sale of Diablo Systems Inc. to Xerox will be for stock valued at around $29 million.

Itel still owns another disk drive maker – Information Storage Systems.

Government Supports CAI

WASHINGTON, D.C. – The National Science Foundation has allocated approximately $15 million for the support of a four and a half year program to test the effectiveness of computer-assisted instruction systems.

The money will initially go to Mitre Corp. and the University of Illinois and will involve a test of the systems with approximately 2,500 students.

Manitoba Starts Service Bureau

WINNIPEG, Manitoba – The Manitoba government is entering the computer industry, with plans to sell available time on its recently purchased second-hand CDC 6500 to private firms. The computer primarily will be used to handle workloads of government agencies such as the Manitoba Public Auto Insurance Corp. and the Manitoba Development Corp. (MDC), noted Premier Ed Schreyer.

Initially, officials of MDC, the province's industrial development agency, considered forming a corporation to compete with private service bureaus, by offering lower rates, but this raised protests from other firms and political parties forcing the government to offer competitive rates.

Supershorts

Computer Machinery Corp. has signed a distributorship agreement with Nissho Iwai Co. Ltd. of Japan for the sale and service of CMC Keyprocessing Systems in Japan, the Ryukyu Islands and Korea.

– – –

Five exponents of interactive-on-line information services will be featured at session five of the 4th National Meeting of the Information Industry Association to be held Apr. 10-12 at the Roosevelt Hotel, New York.

– – –

Twenty-eight firms have been invited by the Electronic Systems Division of the Air Force Systems Command to submit proposals for the replacement of two B-5500s and a Honeywell 1250 at the Military Personnel Center, Randolph Air Force Base, Texas.

– – –

Mohawk Data Sciences Corp. and Computing Efficiency, Inc. have approved in principle the acquisition by MDS of Computing Efficiency, Inc., the parent of Bucode, Inc., a manufacturer and marketer of magnetic tape drives, including a line of tape drives compatible with IBM computers.

Keypunch Falling

Key-Disk, Terminals Seen Input Kings

NEWTON, Mass. – Shared-processor systems (key-to-disk) and terminal systems are grabbing increasing shares of the input marketplace, and are expected to be the devices of the future, according to a recent study by International Data Corp. (IDC) here.

The total installed base of shared-processor systems is expected to jump 84% by the end of this year, to 18,800 stations, according to the report. By 1976, there will be 41,600 units in the field.

The "overall trend is toward smaller systems" and the size of the average system will shrink from 10 to seven station over the next five years, IDC estimates. The average keystation value is expected to fall 38% by 1976, because of continued decreases in component costs, the report states.

Keypunch Decline

While keypunches comprise "almost half" (47.7%) of today's 524,000 data entry units, and the number is expected to grow by 13,000 by the end of the year, its share of the projected market will decline, to 42.5% in 1972, and only 25.8% in 1976.

A 10% decline in the number of unbuffered keypunches is seen by the end of this year, while 80-column buffered units will grow 60% to 58,000 and 96-column buffered units 75%, to a total of 25,600, according to the study.

Single station key-to-tape units will show an 8% growth this year from 48,450 units installed to 52,300 units installed. But by 1976 the number of these units in use will drop to 46,250, below the 1971 total, the firm predicts.

The terminal area as a whole will show a 32% growth rate, from 213,800 installed at the end of 1971 to 282,500 by the end of this year.

Of this growth, CRT terminals, excluding dedicated ones, will grow from a base of 51,700 to 66,500, or 29% this year, but will jump to 176,400 by the end of 1976, the firm estimates.

Non-CRT terminals now account for 162,100 installations and will grow by 33% to 216,000 this year, IDC says. By 1976 it predicts 662,950 non-CRT terminals would be installed in the field.

The overall growth for OCR will be about 23% this year, according to the report, from 1,760 units to 2,160 units in use, excluding Micr, journal readers, mark sense readers and bar code readers. By 1976 there will be 4,670 OCR units installed, IDC says.

"The key-to-tape market has passed its peak," according to John J. Colantino, manager of market research.

"OCR systems, even low-cost ones, are difficult to justify except for very specific applications. But shared-processor systems have reached volume delivery levels, and the terminal sector has received a boost from IBM's introduction of the 3270 CRT data entry system," he added.

Cost, source data acquisition capability, and the demand for increased intelligence at the point of data entry are cited as the three primary factors affecting this trend.

"These three may actually cause the keypunch room as we know it today to disappear entirely from DP installations," Colantino predicts.

Cost effectiveness will remain the prime justification for data equipment changes over the next few years. Users currently spend "almost 30% of their total DP budgets for this operation and are becoming acutely aware of the tradeoffs in terms of implementing new applications," according to IDC.

U.S. Computer Exports Decline While Imports Rise in January

WASHINGTON, D.C. – Exports of computer equipment by U.S. manufacturers were down over 10% in January compared with January a year ago, according to statistics released by the Department of Commerce's Bureau of the Census.

At the same time, imports of DP-related equipment were up during the month.

In the first month of 1972, U.S. manufacturers shipped equipment valued at $92.9 million to overseas locations from U.S. plants, down from the $103.4 million worth of equipment shipped in the same month last year.

The year also started at a lower shipment rate than the end of 1971. The January shipments were down almost 10% from the $100.7 million chalked up in December – a rate that pushed total 1971 shipments past $1.1 billion.

Western Europe was the largest single market area during January, with shipments valued at $50.3 million, according to the Commerce Department unit. Western Europe as a whole was the largest market last year, the department noted.

Of that amount, members of the European Economic Community received shipments valued at $33.7 million, while the UK (not yet included in the Common Market figures) imported equipment valued at $7.4 million and other members of the European Free Trade Association received equipment valued at $6.4 million. Other European countries had imports valued at just under $1 million.

Canada was the next most active market for exports of U.S. equipment, receiving shipments valued at $14.3 million, followed by Japan with imports of $12.9 million worth of U.S.-made computer equipment during the first month of 1972.

The Latin American Free Trade Association was the next most active market, surpassing Asian countries outside of Japan, which had been next on the list at the end of 1971. In total, the Latin American nations received equipment valued at $7.1 million in the next month.

Asian countries, excluding the Near East, had imports amounting to $4.3 million and Near Eastern countries had imports valued at $500,000.

Communist areas in Europe received equipment valued at $100,000, and the exports to Asian communist states were negligible, according to the figures.

The market in Australia was estimated at $1.6 million for the month, and the African market was valued at $700,000.

Most of the U.S. shipments of computers and related equipment were made by air, the department noted, with 3.4 million pounds of equipment valued at $73.1 million being handled by air, while only $4.3 million worth of equipment went by ship.

But while exports of U.S.-made equipment showed a dip during the month, imports of foreign-made equipment showed a sharp rise.

Last January, the U.S. imported $42.8 million worth of "office machinery and computers," but this year the figure jumped to $64.3 million. The December figures showed imports of $62.3 million in equipment.

The majority of the imports came from Western Europe, from which the U.S. imported equipment valued at $22.8 million during January. Of this, $15.1 million came from the European Economic Community and $4.5 million came from European Free Trade Association members, excluding Britain, which accounted for only $2.8 million worth of the imports.

The second major source for U.S. imports was Canada, which shipped equipment valued at $22.6 million to the U.S.

Effects Spreading

IBM Moves Hurt Independents

SAN FRANCISCO – Extended memory producers have been hit hard by the IBM moves to withhold maintenance from users with such devices – and the effects may be spreading to others in the independent peripheral marketplace.

Computer Investors Group, which markets the extended memories from Data Recall, said its order rate for the devices has plummeted after the IBM move in December, even though it previously had been showing a steady growth.

"Users have been scared away from installing these devices," a source at the firm said, "and our business has really been hurt in this area."

Court Case

Another firm marketing the devices, Itel, which is currently suing IBM over the moves, claimed in court that its order rate had fallen from around eight units per month to two units per month since the IBM action.

Many industry sources fear the moves will affect marketing of other independent peripherals – even though IBM has not threatened to withdraw maintenance on any other products at this time.

"The users are afraid to install non-IBM equipment," one said. "This fear could affect everyone in the business, whether they are marketing main memory, disk drives, tape drives, etc.

"The move came just when we were educating users to the cost savings available by going to independents," another manufacturer said. "Most users were beginning to realize they could get significant savings from the devices.

"But if the user faces a maintenance hassle by going to independents – or even if he thinks there is a possibility of problems – he will play it safe and stick with IBM."

'Spur' Line Printer Controller Adapts 1403s for Use With Non-IBM Units

SANTA MONICA, Calif. – A line printer controller which can couple the IBM 1403 printer to non-IBM systems has been developed by Spur Products Corp.

"Now other systems can take advantage of the 1403s many features, such as universal character set, interchangeable chains and trains that offer a selection of type fonts including upper and lower case, high-speed paper slewing and positive paper stacking," according to Spur President Ray Lorenz.

New OEM Products

"The Spur 1403," Lorenz continued, "will be pitched at the OEM market as a supplement to their present printing systems and should provide an answer for those situations where a customer requirement demands that the 1403 characteristics be matched."

The controller is offered as a basic unit without enclosure, and sells for $5,500 in quantities of 10.

The device is supplied tested, with all logic cards, memories and mating connectors, all power supplies (except +5V) and instructions for maintenance and operation, the company said.

Accessories offered with the controller include a pluggable tester/exerciser, a single-phase to three-phase converter, an enclosure and a +5V power supply.

Delivery will begin in May from 2928 Santa Monica Blvd., 90404.

Singer Announces Testers

LITTLE FALLS, N.J. – The SKT-2832 (PAT 302) and SKT 2833 (PAT 203) programmed automatic testers from Kearfott Division of Singer Co. are computer-controlled test systems which can check out such assemblies as A/D converters, analog and digital computers, digital displays, digital processors and similar equipment.

The systems (made up of a general-purpose minicomputer, stimuli generator modules, measurement instrumentation, teletypewriter, mag tape decks, controller and power supplies) can reduce test time dramatically, the company said. One series of tests, involving 1,500 measurements, was cut from 32 hours to 1-1/2 hours, according to the company.

Test programs stored on mag tape may be operator-modified as required to accommodate test requirements; all test routines are computer-monitored for proper test functions. Test results are recorded on tape or printer with off-tolerence conditions flagged to the operator. A variety of test and diagnostic software is available.

Other Products

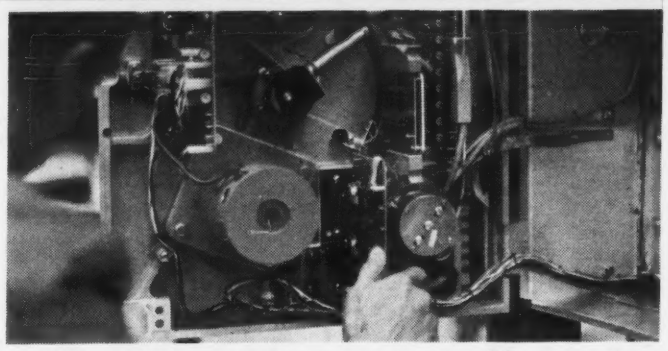
The DPT-415, a module that converts digital panel meter BCD outputs to teletypewriter printer/punch inputs, has been developed by **Digital Laboratories**, Cambridge, Mass., and is priced under $200 in large quantities.

– – –

Computer Labs, Greensboro, N.C., is introducing three high-speed A/D converters capable of 6, 7 and 8 bits of resolution at word rates from dc through 5 MHz. The models 5605, 5705, and 5805 are priced from $3,500 to $4,000.

– – –

Ferrofluidics Corp., Burlington, Mass., has a family of magnetic inks, Ferromagnetic Inks, which do not clog or settle, even in the presence of magnetic fields.



HP Uses Honeywell Unit

Hewlett-Packard has turned to Honeywell Micro Switch for the dc motor in its 7970E magnetic tape unit. The motor (pictured) drives the unit forward or backward at up to 45 in./sec. Fast forward and rewind operate at 160 in./sec.

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Poland Claims Advanced Mini, Cites Production Lags

By Bohdan O. Szuprowicz
Special to Computerworld

WARSAW – Rumored since June 1971, Poland's K-202 minicomputer, claimed to be one of the most advanced in its class in the world, appears to have arrived at least in prototype form.

Besides a claim of 500,000 operation/sec and reports that two British companies plan to market it, no other characteristics are available at this time.

But Jerzy Huk, director of Poland's Mera, the Automation and Instrumentation Industry Association, confirmed the existence of an advanced minicomputer in an interview reported last month.

The K-202 has been constructed under the direction of Engineer Jacek Karpinski, but his effort parallels the work of engineer B. Piwowar on Odra 1325, a third-generation minicomputer designed by ELWRO, a state research and development center.

Neither machine will be part of the Soviet-led Riad project under which all Eastern European countries and Russia participate in developing a common IBM 360-like series of machines and peripherals.

No Production Models

As yet there are no production models of the K-202, although plans call for the production of 330 units annually toward the end of the present five-year plan. According to Huk, the 1325 can be manufactured entirely in Poland although some integrated circuitry must still be imported.

This also seems to be why progress is difficult on the K-202 which presumably involves large-scale integration not available in Poland at this time.

Huk pointed out that the next step must be completion and acceptance by foreign buyers of the next (second) prototype which may result in several sales abroad.

Apparently this work will require a separate plant. The Mera organization is working with Karpinski preparing the anticipated manufacturing capabilities.

How well development is progressing on the advanced K-202 is found in Karpinski's article in a series called "Information Blocade," published by a Warsaw satirical weekly called "Kulisy."

No Support

Although he has a working model of one of the most advanced minicomputers, Karpinski claimed there is no support for this project even though most agree it may bring in much needed foreign currency.

Karpinski said every transformer must be wound manually and simple tools to bend sheet metal are unavailable.

Actually, the K-202 design, according to British press reports, belongs to Data-Loop of Richmond, Surrey, which also holds marketing rights to sell the machine in all Eastern European countries except Poland.

The other British firm, M.B. Metals, a subsidiary of Carbon Electric Holdings Group, was involved in making and financing the computer and signed an agreement with Poland's Metronex last May to market the K-202 in the rest of the world.

Commerce Plans Three European Computer Shows

WASHINGTON, D.C. – The Office of International Trade Promotion in the U.S. Department of Commerce has slated three trade shows for computer equipment in Europe during the next 12 months.

"EDP IV" will be held at the U.S. Trade Center in Stockholm, Sweden, Sept. 18-23; a U.S. exhibition will be sponsored at "Computer '72" in London, Dec. 4-8; and a show on minicomputers and peripherals is planned for the U.S. Trade Center in Frankfurt on Feb. 12-16, 1973.

The Commerce Department said the areas covered by these exhibitions provide "excellent export markets for U.S. producers of computers and computer-related equipment."

U.S. computer sales to Scandinavia in 1971 were $42.1 million, up 65% over 1969 shipments, Commerce said.

The UK imported $145.7 million of computers from U.S. manufacturers, an increase of 40% over 1969 purchases, it added.

Germany has been "the best market in Europe" for U.S.-made computers and computer-related equipment and products, according to Commerce. U.S. export sales to Germany in 1971 were $194.1 million, up 66% over 1969 figures. The total market in Germany is expected to reach $1.2 billion by 1974, with imports to account for $300 million.

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Fujitsu Completes Experimental Laser Memory System, Plans Computer Use

Dempa Publications, Japan

TOKYO – Fujitsu Ltd. has announced completion of an experimental production of a holographic memory system which can be used with a computer to form an integrated data reading system.

One hologram has a memory capacity of 10 million bits.

In Fujitsu's system, a laser is beamed onto a hologram through a photo shutter and a polarizer and the resultant interference pattern is converted into electric signals by a semiconductor probe.

Two methods are employed for the storage of data: one uses the laser to implant data on a hologram, the other prints the interference patterns of the laser by computer. The firm expects the cost/bit to be about one tenth of the present cost of magnetic disks.

Argon laser wavelength of 4,880 Å is the laser source. One hologram is divided into 48 x 48 pages and one page contains 4,608 bits (72 x 64 bits). The size of one page is 1.5mm x 1.7mm. The laser is beamed page by page; the average access time is 5 μsec, and the polarizing speed is 2 μsec, with the random access method.

Fujitsu has been working for more than 10 years on the development of laser techniques, and since 1970 it has been receiving a government subsidy for the research.

CMC Lands French Order

LOS ANGELES – CMC France, a subsidiary of Computer Machinery Corp. has landed an order for the purchase of over $1.6 million worth of Key-processing systems from the Cheques Postaux, a department of the French Government. This is CMC France's largest order to date.

Contracts

The contract comprises 14 CMC 9s, representing 300 Key-stations at seven locations in France. Seven systems already have been delivered to Cheques Postaux offices in Paris, Lille, Lyon and Grenoble, with another seven scheduled for delivery to Nancy, Limoges and Chalons by September of this year.

The CMC 9s will be used primarily in a banking application.

Other Contracts

Autocomp, Inc. has been awarded a contract for the compilation, indexing and publication of the District of Columbia rules and regulations through computerization and electronic photocomposition.

Rapidata, Inc. has signed a one-year agreement to provide dedicated computer services to the New Jersey-Bell Telephone Co.

Microdata Corp. has received a $200,000 contract from the Nasa Ames Research Center, Moffett Field, Calif., for eight computer-controlled data communications systems.

Xerox Data Systems has been issued a $3.5 million contract by the Navy for real-time telemetry processing systems used for in-flight aircraft testing.

Computing and Software, Inc. has received a one-year contract extension from the Air Force to continue DP and analysis services at the Rocket Propulsion Laboratory, Edwards, Calif.

The Instrumentation Division of Vidar Corp., Mountain View, Calif., has selected Cipher Data Products' line of incremental tape recorders.

Memorex Corp. has awarded a contract to Memory Technology, Inc. for over 100 read only memory systems to provide control storage for Memorex's 660 disk controller.

Comten Inc. has been awarded a contract valued at over $2 million for hardware, software and maintenance services of a computer switching system for the Atomic Energy Commission's Secure Automatic Communications Network. The system consists of five Comten communications processors.

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Mixed Results Shown by Two Leasing Concerns; Non-DP Activities Credited

SAN FRANCISCO – Two firms engaged in DP leasing activities have reported different earnings pictures, reflecting in part fluctuations in their non-DP activities.

Boothe Computer Corp., hindered by a $1.4 million loss for the fourth quarter, registered earnings of $1 million or 54 cents per share, down from last year's $2.8 million or $1.42 per share.

Revenues rose to $60.5 million from $45.3 million in the year, and to $15 million from $13 million in the fourth quarter.

The loss from continuing operations in the quarter resulted principally from a write-off of obsolete non-computer equipment of Producers Service Corp. and continued expansion of Courier Terminal Systems' marketing and manufacturing capability, noted D.P. Boothe Jr., chairman of the board.

Lower earnings for the year also resulted from an extraordinary $1.1 million charge as a result of a write-down of the firm's investment in Boothe Resources International and a $546,000 loss from that discontinued operation, Boothe said.

All operations of questionable value have been "discontinued or sharply reduced to the point where they should not have any future significant impact on the continued progress of the company," Booth explained.

Meanwhile, Dearborn-Storm Corp., formerly Dearborn Computer and Marine, reported record revenues of $10.6 million for the first quarter ended Jan. 31, and a rise in earnings.

The DP leasing and offshore drilling firm indicated 63% of revenue and 61% of earnings in the period came from offshore drilling and marine services businesses.

Revenues rose 17% from the $9.1 reported a year ago, and earnings reached $1.1 million or 40 cents per share, compared with $882,000 or 31 cents per share in the first quarter of last year.

Despite an expected period of "market readjustment" on third-party IBM 360 lease rates, Dearborn-Storm is optimistic about its leasing income. In December it indicated the leasing business was "only 21 months away from completely retiring its share of our total debt."

MDS Sales Outpace Net

HERKIMER, N.Y. – Mohawk Data Systems Corp. attained record revenues in the nine months ended Jan. 31, but earnings drooped.

Revenues reached $87 million, up from 1970's restated $68.1 million; earnings were $1.6 million or 28 cents per share, down from $2.3 million or 40 cents per share.

Results were restated to reflect the merger of Atron Corp. on a pooling-of-interests basis and a change in accounting treatment for third-party sales.

The "costly transition from a supplier of peripheral equipment to a company marketing data processing systems" adversely affected profits, according to President Richard P. Rifenburgh.

At the same time, during the last three months rental revenues, exclusive of the recently acquired Marshall Data Systems, rose by slightly more than $1 million, he said.

End-user backlog at Jan. 31, excluding Marshall, was at the highest level in the company's history, Rifenburgh noted.

Although rental revenues from the new System 2400 and Key Display System (KDS) were "not significant" these systems accounted for more than 50% of the value of outstanding orders from end users at the end of the period, Rifenburgh said.

CMC, Inforex Claim Records for Year

BURLINGTON, Mass. – Two leaders in the key-to-disk market have reported records – Inforex in revenues and Computer Machinery Corp. in orders and deliveries.

Inforex's revenues for 1971 amounted to $4.9 million, including fourth quarter revenues of $2.1 million, compared with 1970 revenues of $791,585. Losses for the year, however, reached $5.7 million or $3.98 per share compared to losses equal to $3.27 per share a year earlier.

At CMC the firm announced record orders of $33.9 million during 1971, up over 70% from 1970. Equipment delivered to customers increased to $26.8 million, up over 90% from the previous year, according to the firm. The firm claims to have delivered equipment valued at over $43 million since 1969.

Nickels & Dimes

RCA added to its balance sheet the $250 million extraordinary charge associated with its withdrawal from the computer business – and produced a $155.8 million loss for 1971. Total revenues rose to $3.5 billion, from $3.3 billion in 1970, when earnings were $91.3 million, or $1.16 a share.

$$$

Overall 1971 profits of **Sierra Research** were reduced by operating losses of its Computer Products Division and its subsidiary, BCD Computing Corp., according to Sierra.

$$$

Orders booked for **Ultimacc Systems'** programmed computer system in the first six weeks of '72 exceeded total systems sales for all of 1971.

$$$

Despite a 45% drop in revenue during 1971, to $6.5 million from $11.7 million, components-maker **Technitrol** managed to turn around its profits picture. Earnings were $206,692 compared with last year's loss of $88,186.

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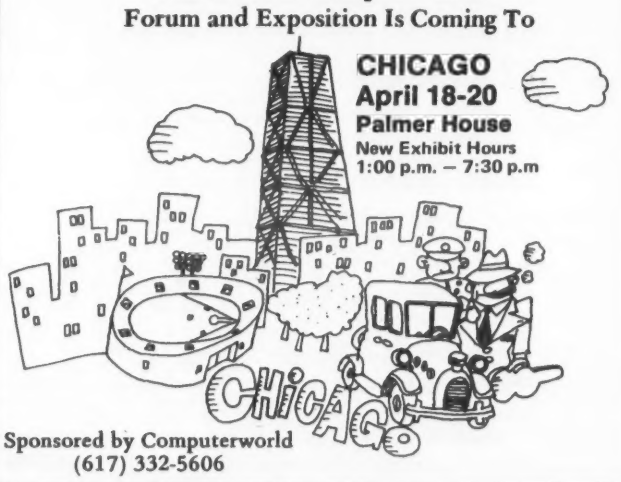

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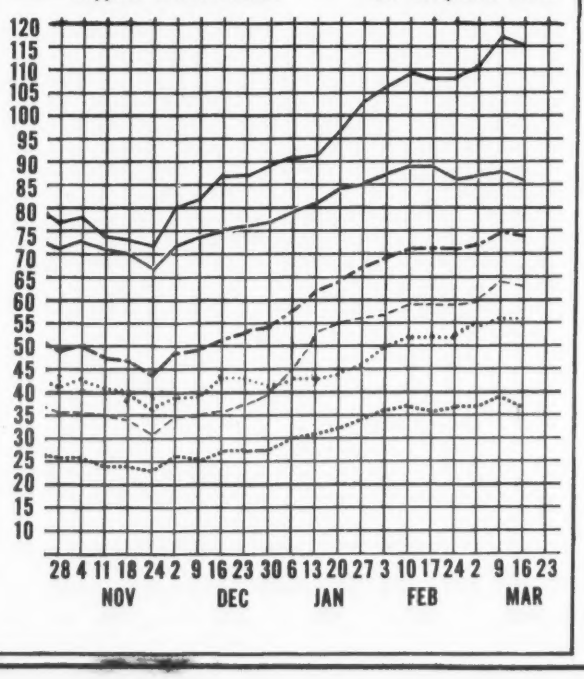
EXCH		71-72 RANGE (1)	CLOSE MAR 16 1972	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 4	1 1/2	- 1/4	-14.2
A	APPLIED DATA RES.	5- 13	5 3/8	- 5/8	-10.4
O	APPLIED LOGIC	1- 3	2 1/4	0	0.0
N	AUTOMATIC DATA PROC	44- 91	86	-4 7/8	-5.3
O	AUTO SCIENCES	1- 8	5/8	0	0.0
O	COMPUTER DIMENSIONS	9- 17	12	0	0.0
O	COMPUTER NETWORK	2- 11	4 3/4	0	0.0
N	COMPUTER SCIENCES	6- 17	9 1/2	+ 7/8	+10.1
O	COMPUTER TECHNOLOGY	4- 11	6 3/4	0	0.0
O	COMPUTER USAGE	5- 16	12	+ 5/8	+5.4
O	COMP AUTOMOT REPORTS	6- 13	7	- 1/4	-3.4
N	COMPUTING & SOFTWARE	17- 45	25 3/4	-1	-3.7
O	COMRESS	1- 4	2 3/4	+ 1/2	+22.2
O	COMSHARE	4- 10	9 5/8	+1 5/8	+20.3
O	DATA AUTOMATION	1- 4	3/8	+ 1/8	+50.0
O	DATA PACKAGING	6- 10	9 1/4	- 3/4	-7.5
O	DATAMATION SERVICE	1- 3	7/8	0	0.0
L	DATATAB	3- 8	7 1/2	- 3/4	-9.0
O	EDP RESOURCES	5- 16	6	- 7/8	-12.7
A	ELECT COMP PROG	2- 7	3 7/8	- 5/8	-13.8
N	ELECTRONIC DATA SYS.	34- 85	59	-3 1/8	-5.0
O	INFORMATICS	6- 15	8 1/2	- 3/4	-8.1
O	I.O.A. DATA CORP	1- 3	2	+ 1/4	+14.2
A	ITEL	7- 23	10 1/4	-1 1/4	-10.8
O	KEANE ASSOCIATES	4- 14	5 1/4	+ 3/4	+16.6
O	KEYDATA CORP	5- 14	10 1/8	- 1/8	-1.2
O	LOGICON	5- 8	8 1/8	0	0.0
A	MANAGEMENT DATA	5- 11	8 1/4	+ 3/8	+4.7
O	NATIONAL CSS INC	7- 14	12	0	0.0
O	NAT COMP ANALYSTS	1- 4	3/4	0	0.0
P	ON LINE SYSTEMS INC	7- 18	10	-2 1/4	-18.3
N	PLANNING RESEARCH	10- 26	15 3/4	-1 3/8	-8.0
O	PROGRAMMING METHODS	16- 29	23 3/4	+ 1/4	+1.0
O	PROGRAMMING & SYS	1- 4	1 5/8	- 1/8	-7.1
O	SCIENTIFIC COMPUTERS	2- 4	3 1/8	0	0.0
O	SIMPLICITY COMPUTER	1- 4	4 1/2	- 1/8	-2.7
O	SOFTWARE SYSTEMS	1- 3	1 3/8	0	0.0
O	TBS COMPUTER CENTERS	4- 9	5	+ 1/8	+2.5
O	TOLLEY INTL CORP	3- 8	10 3/4	-1 1/4	-10.4
O	TRACOR COMPUTING	2- 5	1 3/4	- 1/8	-6.6
O	TYMSHARE INC	4- 15	8 1/8	- 1/8	-1.5
O	UNITED DATA CENTER	2- 8	6 3/4	+ 1/4	+3.8
N	UNIVERSITY COMPUTING	14- 38	21 5/8	- 1/8	-0.5
A	URS SYSTEMS	5- 11	7 7/8	- 7/8	-10.0
O	VORTEX CORP	2- 6	5	- 1/4	-4.7
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	24- 48	39 3/4	-1 3/4	-4.2
O	ALPHANUMERIC	1- 6	1 1/4	0	0.0
N	AMPEX CORP	8- 25	8 1/2	- 1/8	-1.4
O	ANDERSON JACOBSON	5- 10	6 1/4	- 3/8	-5.6
O	ATLANTIC TECHNOLOGY	3- 9	7 3/4	-1	-11.4
A	BOLT,BERANEK & NEW	4- 12	11 1/8	+ 1/8	+1.1
N	BUNKER-RAMO	6- 17	10 1/2	-1	-8.6
A	CALCOMP	14- 33	21 1/4	-3 1/8	-12.8
O	COGNITRONICS	2- 9	3 3/8	- 1/8	-3.5
O	COMPUTER COMMUN.	5- 19	5 3/4	0	0.0
A	COMPUTER EQUIPMENT	3- 7	3 7/8	- 1/8	-3.1
A	COMPUTEST	4- 20	7 1/2	- 1/8	-1.6
O	CONSOL COMPUTER LTD.	1- 12	1/2	0	0.0
A	DATA PRODUCTS CORP	3- 10	5 5/8	- 1/8	-2.1
O	DATA RECOGNITION	3- 8	4	- 1/4	-5.8
O	DATA TECHNOLOGY	3- 9	3 1/2	- 1/2	-12.5
O	DI/AN CONTROLS	3- 7	5 1/4	+ 1/4	+5.0
O	DIGITRONICS	2- 8	3 3/4	0	0.0
N	ELECTRONIC M & M	5- 16	6 5/8	- 5/8	-8.6
O	FABRI-TEK	2- 5	4	- 1/2	-11.1
O	GENERAL COMPUTER SYS	6- 16	14	+ 1/2	+3.7
N	GENERAL ELECTRIC	53-124	63 1/2	- 1/2	-0.7
N	HAZELTINE CORP	6- 13	11 3/4	+ 1/4	+2.1
O	INFOREX INC	17- 49	35	-2	-5.4
O	INFORMATION DISPLAYS	3- 8	3 1/4	0	0.0
O	MANAGEMENT ASSIST	1- 2	1 3/8	0	0.0
A	MARSHALL INDUSTRIES	7- 27	12 1/8	-1 1/2	-11.0
N	MEMOREX	20- 78	29 1/4	- 1/4	-0.8
A	MILGO ELECTRONICS	12- 34	31 7/8	-1 5/8	-4.8
N	MOHAWK DATA SCI	15- 47	24 1/2	+ 1/8	+0.5
O	OPTICAL SCANNING	6- 18	11 1/2	-1 1/4	-9.8
O	PERTEC CORP	9- 18	15 3/4	+1	+6.7
O	PHOTON	6- 15	14	+ 1/4	+1.8
A	POTTER INSTRUMENT	11- 25	18	- 3/4	-4.0
O	PRECISION INST.	7- 16	8 1/4	- 1/2	-5.7
O	RECOGNITION EQUIP	9- 26	11	-1 1/2	-12.0
O	REDCOR CORP.	1- 9	1/8	- 1/8	-50.0
N	SANDERS ASSOCIATES	9- 22	19 3/4	- 7/8	-4.2
O	SCAN DATA	6- 15	11 1/2	-1 1/8	-8.9
O	SYCOR INC	3- 11	8 1/2	- 1/4	-2.8
O	TALLY CORP.	6- 16	9 7/8	- 3/8	-3.6
N	TEKTRONIX INC	28- 44	43 5/8	- 3/8	-0.8
N	TELEX	8- 22	12 3/8	- 1/2	-3.8
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	9- 19	10 5/8	-1	-8.6
O	BALTIMORE BUS FORMS	6- 10	6 1/2	- 1/2	-7.1
A	BARRY WRIGHT	7- 13	11	-1 1/4	-10.2
A	DATA DOCUMENTS	14- 29	23 5/8	+1 7/8	+8.6
O	DUPLEX PRODUCTS INC	8- 14	13 1/2	+ 1/4	+1.8
N	ENNIS BUS. FORMS	5- 13	7 7/8	- 3/8	-4.5
O	GRAHAM MAGNETICS	9- 35	23 1/2	-1 1/8	-4.5
O	GRAPHIC CONTROLS	6- 15	14	0	0.0
N	3M COMPANY	96-145	144 3/8	+ 7/8	+0.6
O	MOORE BUS. FORMS	36- 48	45 3/4	-1 1/8	-2.3
N	NASHUA CORP	29- 56	56 1/8	0	0.0
O	REYNOLDS & REYNOLD	37- 77	40 1/2	-4 1/2	-10.0
O	STANDARD REGISTER	14- 23	17 3/4	-1 1/4	-6.5
O	TAB PRODUCTS CO	8- 17	15	+ 1/4	+1.6
N	UARCO	23- 34	25 3/4	- 1/2	-1.9
A	WABASH MAGNETICS	5- 10	9 3/8	- 1/2	-5.0
N	WALLACE BUS FORMS	18- 26	25 1/4	+ 3/8	+1.5
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	105-171	169 1/4	-1 5/8	-0.9
N	COLLINS RADIO	10- 20	16 3/8	-1 1/2	-8.3
N	CONTROL DATA CORP	34- 83	60 1/8	-6 1/4	-9.4
O	DATA GENERAL CORP	19- 80	73 3/4	- 1/4	-0.3
O	DIGITAL COMP CONTROL	4- 24	18 1/2	- 3/4	-3.8
N	DIGITAL EQUIPMENT	53- 97	87 1/2	-5 1/2	-5.9
N	ELECTRONIC ASSOC.	5- 11	10 1/2	+1 3/4	+20.0
A	ELECTRONIC ENGINEER.	5- 14	11 1/8	-1 1/8	-9.1
N	FOXBORO	25- 46	37	+ 1/4	+0.6
O	GENERAL AUTOMATION	9- 26	24	- 1/4	-1.0
N	HEWLETT-PACKARD CO	30- 56	56 1/4	+ 7/8	+1.5
N	HONEYWELL INC	83-158	148	-8 3/4	-5.5
N	IBM	284-384	373	-10	-2.6
O	INTERDATA INC	6- 15	14 3/8	- 1/8	-0.8
N	NCR	25- 49	33 3/8	- 3/4	-2.1
N	RAYTHEON CO	27- 46	42 7/8	- 1/8	-0.2
N	SPERRY RAND	23- 39	37 1/8	-1 3/8	-3.5
A	SYSTEMS ENG. LABS	7- 18	15	-1	-6.2
N	VARIAN ASSOCIATES	11- 18	17 1/2	- 3/8	-2.0
N	VICTOR COMPTOMETER	12- 27	21 7/8	+ 1/2	+2.3
N	WANG LABS.	29- 50	38 7/8	+ 3/8	+0.9
N	XEROX CORP	85-143	138 1/2	-4	-2.8
	LEASING COMPANIES				
A	BOOTHE COMPUTER	11- 27	12 3/8	+ 1/8	+1.0
O	BRESNAHAN COMP.	2- 4	2 3/4	- 1/8	-4.3
O	COMPUTER EXCHANGE	1- 9	1 7/8	- 1/4	-11.7
A	COMPUTER INVSTRS GRP	7- 14	13 1/8	- 1/2	-3.6
N	DPF INC	8- 19	11	- 5/8	-5.3
O	DATRONIC RENTAL	2- 4	3 1/2	0	0.0
A	DCL INC	5- 13	8 3/4	- 5/8	-6.6
A	DEARBORN-STORM	12- 25	23 1/8	- 3/4	-3.1
A	DPA, INC.	4- 9	6 7/8	+ 1/4	+3.7
A	GRANITE MGT	7- 13	11	0	0.0
A	GREYHOUND COMPUTER	7- 11	9 1/2	- 1/2	-5.0
N	LEASCO CORP	16- 26	23 1/4	- 3/4	-3.1
O	LECTRO MGT INC	2- 5	3 5/8	+1 1/8	+45.0
O	NCC INDUSTRIES	3- 11	9 5/8	- 3/4	-7.2
A	ROCKWOOD COMPUTER	3- 9	6 3/8	+ 1/8	+2.0
O	SYSTEMS CAPITAL	3- 7	7 1/8	+ 5/8	+9.6
N	U.S. LEASING	16- 48	46 3/4	+ 1/8	+0.2

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

INTERDATA
Year Ended Dec. 31

	1971	1970
Shr Ernd	$.09	$.02
Revenue	8,762,500	6,458,400
Earnings	155,800	43,400

TELEX
Nine Months Ended Dec. 31

	1971	1970
Shr Ernd	$.28	$.48
Revenue	60,870,000	57,219,000
Earnings	2,888,000	5,050,000

BUNKER-RAMO
Year Ended Dec. 31

	a1971	1970
Shr Ernd	$.09	$.36
Revenue	224,669,407	231,797,142
Earnings	4,256,573	9,141,013
3 Mo Shr	.06	b.....
Revenue	57,929,613	52,073,677
Earnings	1,776,595	150,764

a-Preliminary. b-Preferred dividend requirements exceeded net income.

BOLT BERANEK & NEWMAN
Three Months Ended Dec. 31

	1971	1970
Shr Ernd	$.16	$.06
Revenue	4,936,500	4,088,600
Loss Disc Op	.....	88,700
Earnings	189,800	74,400
6 Mo Shr	.30	.10
Revenue	9,125,100	8,074,800
Loss Disc Op	.....	210,500
Earnings	360,800	124,700

DATRONIC RENTAL
Three Months Ended Dec. 31

	1971	1970
Shr Ernd	$.08	$.08
Revenue	840,486	799,729
Earnings	57,578	55,293
6 Mo Shr	.16	.20
Revenue	1,597,690	1,567,454
Earnings	109,882	133,534

APPLIED MAGNETICS
Three Months Ended Dec. 31

	1971	1970
Shr Ernd	$.07	$.05
Revenue	5,632,100	5,810,834
Earnings	282,550	208,210

MICROFORM DATA SYSTEMS
Six Months Ended Jan. 28

	1972	1971
Revenue	$322,498	$163,706
Loss	1,223,463	1,486,299

LEASCO
Three Months Ended Dec. 31

	1971	1970
Shr Ernd	$.63	$.52
Revenue	155,561,000	144,782,000
Spec Cred	.....	a2,457,000
Earnings	10,164,000	b10,623,000

a-From sale of Reliance Insurance Co.'s former home office building to the U.S. Government. b-Equal to 67 cents a share.

APL
Three Months Ended Dec. 31

	1971	1970
Shr Ernd	$.51	$.48
Revenue	39,251,749	35,497,674
Earnings	1,081,230	1,015,669
6 Mo Shr	.94	.88
Revenue	72,456,681	67,982,704
Earnings	1,994,249	1,864,687

DATA-DESIGN LABORATORIES
Six Months Ended Dec. 31

	1971	1970
Shr Ernd	a$.13	$.02
Revenue	3,787,135	4,264,578
Loss Disc Op	.....	99,760
Tax Cred	62,000	.....
Earnings	b209,320	19,960

a-Based on income before tax credit. b-Equal to 19 cents a share.

RECOGNITION EQUIPMENT
Three Months Ended Jan. 31

	1972	1971
aShr Ernd	$.02	$.04
Revenue	8,667,000	8,630,000
bTax Cred	188,000	387,000
cEarnings	310,000	602,000

a-Based on income before tax credit. b-Estimated income tax benefits from loss carryforwards. c-Equal to 6 cents a share in 1972 and 12 cents a share in 1971.

SEISMIC COMPUTING
Three Months Ended Dec. 31

	1971	1970
aShr Ernd	$.09	$.04
Revenue	4,598,000	4,283,000
bSpec Cred	12,000	9,000
cEarnings	120,000	58,000

a-Based on income before special credit. b-From repurchase of subordinated debentures. c-Equal to 10 cents a share in 1971 and 5 cents a share in 1970.

SCAN-DATA
Year Ended Dec. 31

	1971	1970
Revenue	$3,311,492	$2,193,264
Loss	975,398	1,795,811
3 Mo Shr	.02	.....
Revenue	1,220,367	209,680
Earnings (Loss)	25,700	(710,023)

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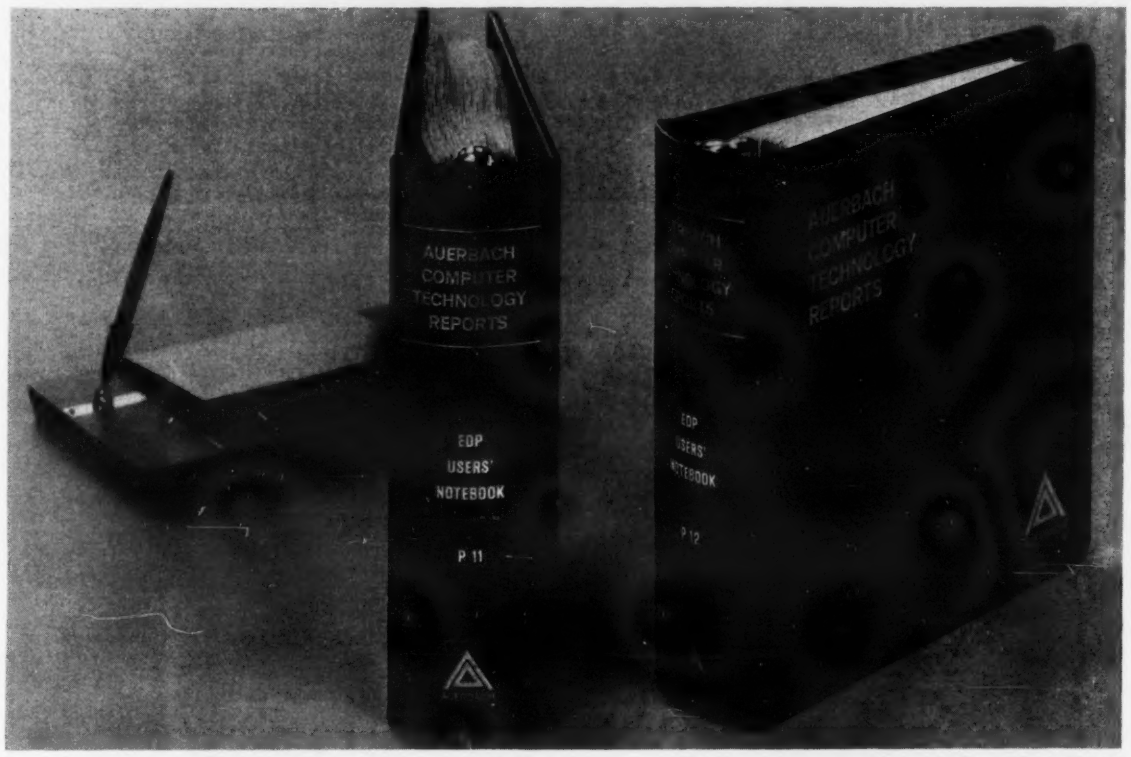

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